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Supreme Court, U.
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IN THE

Supreme Court of the United States

OCTOBER TERM, 1929.

STATE OF WISCONSIN, STATE OF MINNESOTA, STATE OF OHIO and STATE OF PENNSYLVANIA, *Complainants,* vs. STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.* STATE OF MISSOURI, STATE OF KENTUCKY, STATE OF TENNESSEE, STATE OF LOUISIANA, STATE OF MISSISSIPPI and STATE OF ARKANSAS, *Intervening Defendants.*	No. [redacted] Original.	6
STATE OF MICHIGAN, *Complainant,* vs. STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.*	No. [redacted] Original.	10
STATE OF NEW YORK, *Complainant,* vs. STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.*	No. [redacted] Original.	11

BRIEF OF DEFENDANTS UPON THE HEARING OF THE EXCEPTIONS FILED BY ALL PARTIES TO THE SPECIAL MASTER'S REPORT ON RE-REFERENCE.

DUNTHORP-SARGENT PRINTING COMPANY, CHICAGO.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1929.

STATE OF WISCONSIN, STATE OF MINNESOTA, STATE OF OHIO and STATE OF PENNSYLVANIA, *Complainants,* *vs.* STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.* STATE OF MISSOURI, STATE OF KENTUCKY, STATE OF TENNESSEE, STATE OF LOUISIANA, STATE OF MISSISSIPPI and STATE OF ARKANSAS, *Intervening Defendants.*	No. 7, Original.
STATE OF MICHIGAN, *Complainant,* *vs.* STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.*	No. 11, Original.
STATE OF NEW YORK, *Complainant,* *vs.* STATE OF ILLINOIS and SANITARY DISTRICT OF CHICAGO, *Defendants.*	No. 12, Original.

DEFENDANTS' BRIEF UPON EXCEPTIONS TO SPECIAL MASTER'S RE-REFERENCE REPORT.

STATEMENT OF CASE.

These original suits in equity, instituted by certain States bordering upon the Great Lakes to enjoin the diversion of water from Lake Michigan at Chicago by the defendant, Sanitary District, are again before the Court

for hearing upon the exceptions filed by all parties to the Special Master's Report on Re-reference pursuant to the opinion and order of the Court of January 14, 1929.

The Court's opinion (278 U. S. 367) was rendered pursuant to a hearing upon the exceptions of the Complainants to the Special Master's Original Report filed November 23, 1927, and it is printed for convenience as an appendix to this brief.

THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS OF THE SPECIAL MASTER'S REPORT ON RE-REFERENCE.

The re-reference was conceived by the Special Master to embrace the determination of the practical measures required to accomplish with due speed the elimination of the unwarranted part of the diversion, namely, that portion which was and is used to oxidize sewage and wastes and which may not be required in the interest of navigation and its protection when practicable artificial means are used to purify said sewage (Master's Report, p. 4*). The Special Master having found what plants and structures are practicable, (costing approximately $176,000,000), to be installed and put in operation to purify and eliminate sewage and wastes, was confronted with the fact, well known in the sanitary engineering art, **that such works will not entirely, (100%), purify, eliminate or dispose of all the sewage and wastes of the great metropolitan area of Chicago and its environs** (Master's Report, p. 35). **The extent of such purification or elimination of sewage and wastes will be only 85 to 90 per cent of complete theoretical purification at ordinary dry weather times after all such sewage disposal works are in operation** (December 31, 1938). These works will not and

*NOTE: The Special Master's Report on Re-reference filed December 17, 1929, will be referred to herein as "Master's Report," and the Special Master's Original Report of November 23, 1927, will be referred to as "Master's Original Report."

cannot practicably at *storm times treat a volume of sewage flow in sewers substantially in excess of 150 per cent of the dry weather flow.* At storm times all flow in the sewers in excess of 1½ times the dry weather flow never will come in contact with or reach the sewage disposal plants, and the sewage and wastes therein will be wholly untreated (Master's Report, pp. 34, 35).

Consequently, the effluents from the sewage disposal plants containing the residual wastes equal to 15 per cent, (maybe 10 per cent), of the untreated sewage of the human population and industrial waste equivalent population, (6,000,000 on December 31, 1938, when all works shall be in operation according to the Master's Report and 6,800,000 in 1945), served by the plants, and at storm times vast and increasing quantities of wholly untreated sewage and wastes must pass into the channels of the Chicago and Calumet Rivers and Canals of the Sanitary District, part of the waters of the Port of Chicago (Master's Report, p. 136).

These effluents, at dry weather times equal to about 1,700 cubic feet per second flow in the sewers, and the storm water, equal frequently to 6 or 7 times that amount, must pass from the rivers and channels of the Port of Chicago either into Lake Michigan or away from the Lake through the Main Drainage Canal to the DesPlaines River at Lockport (Master's Report, pp. 92, 93, 138), where they have been *all* discharged for the last thirty years and where they were, *to a considerable degree,* passed for almost fifty years before that (Joint Abst., 87).

The Special Master, having had the benefit of the opinions of the various experts for all the parties, and *particularly* of General Jadwin, then Chief of Engineers of the United States Army, called to testify by the

Special Master, also concluded that, while no discharge at Lockport is required for purposes of navigation in the Chicago River so far as depths are concerned, nevertheless it would be **incompatible with the interests of navigation and its protection in the rivers and canals of the Port of Chicago, including the Chicago Harbor, for these effluents and storm water, with its untreated sewage and wastes, to be discharged into Lake Michigan** (Master's Report, pp. 126, 138); and that they *should pass* in the interest of navigation and its protection, *through the Main Drainage Canal to the DesPlaines River, together with a reasonable amount of water from Lake Michigan to prevent the waters of the Port of Chicago, including the Harbor and Shore waters, becoming objectionable from a nuisance standpoint to navigation and to other interests such as bathing and domestic water supply uses* (Master's Report, pp. 126, 135-140).

Believing that he was directed by the Court's Opinion (January 14, 1929) to consider the subject, the Special Master concluded from the opinions of said experts and from the opinions of General Jadwin, the Chief of Engineers, that the amount of diversion in the interest of navigation and its protection, so far as navigation in the Port of Chicago was concerned, should be, when all the works are in operation, 1,500 cubic feet per second* (Master's Report, pp. 138-140). Thus, the total discharge from the Drainage Canal at Lockport would be 3,200 cubic feet per second, that is, 1,700 second feet of effluent at ordinary dry weather times (assumed to be approximately the pumpage from the lake for ordinary domestic purposes), plus the above mentioned 1,500 cubic feet per second which includes about 1,000 cubic feet per

*NOTE: "Cubic feet per second" will at times be indicated by the abbreviation c.f.s.

second direct from the Lake, and about 500 cubic feet per second, being the rain water runoff of the Chicago River and Calumet River Watersheds.

Having concluded as a matter of law that complainants *had not* by their pleadings *complained* and *could not* in law *complain* of the use of water pumped for ordinary domestic purposes by the City of Chicago and the other cities within the territorial limits of the Sanitary District, and that the place of discharge of sewage in the form of effluents from sewage treatment plants and storm water, was within the discretion of the defendants (Master's Report, pp. 120, 121), the Special Master further concluded that the said 1,500 cubic feet per second in addition to the pumpage, would not cause such a substantial injury to the complainants as to warrant the discharge of effluents and storm water wastes into Lake Michigan, thus interfering with navigation and bathing beaches and endangering the domestic water supply (Master's Report, p. 140).

The Special Master also recommended certain reductions in the diversion at certain times during the construction period corresponding to completion dates as fixed by him for important units of the construction program. Consequently he recommended that the diversion be fixed at 6,500 cubic feet per second (in addition to pumpage) from July 1, 1930, to the date when controlling works should be installed either at the mouth of the Chicago River near Lake Michigan or in the Main Drainage Canal near its northern terminus, to prevent reversals or flows of the Chicago River, in times of storm, into Lake Michigan, at which time the diversion should be reduced to 5,000 cubic feet per second in addition to domestic pumpage; and at that amount it should continue to the end of the construction period, December 31, 1938,

when it should be reduced as before stated to 1,500 cubic feet per second, in addition to pumpage.

However, the reduction in diversion below the 6,500 second feet after July 1, 1930, is to be subject, according to the Master's Report, to the approval of plans (to be submitted immediately to the War Department by the Sanitary District) by the Secretary of War on the recommendation of the Chief of Engineers for and the construction of said controlling works within two years after such approval of plans (Master's Report, pp. 142, 143, 147).

The decree recommended by the Special Master, in addition to embodying the above mentioned findings as to completion dates for the different sewage treatment works, including said controlling works to prevent flows into Lake Michigan from the Chicago River, and as to amounts of diversion (in addition to pumpage), during the construction period, and at the end of such period, provides, in ordinary mandatory and coercive terms, for injunctions against the defendants to compel the installation of the said works at the times stated and to prevent diversions in excess of those fixed. The decree recommended also provides that the Court should retain jurisdiction for the purpose of entering any order or direction or modification of the decree or any supplemental decree in relation to the subject matter, and for the purpose of receiving and acting upon reports required by the decree to be filed semi-annually, beginning July 1, 1930, by the Sanitary District relating to the progress of construction work on the sewage disposal plants, the extent and effects of the operation of plants placed in operation, and the average diversion of water covering the period from the entry of the decree to the date of the particular report.

The recommended decree also provides that upon the coming in of each of said reports, any of the parties may apply for such action or relief, either with respect to the time to be allowed for the construction or the progress of construction, or the methods of operation of any of the sewage treatment plants, or with respect to the diversion of water from Lake Michigan, as may be deemed to be appropriate, and that at the foot of the decree the parties may apply for any other or further action or relief, irrespective of the filing of the above mentioned reports (Master's Report, pp. 148, 149).

DEFENDANTS' CONTENTIONS ON THEIR EXCEPTIONS.

Defendants' objections to the Special Master's Report embrace principally the following contentions:

(1) The Master's Report (p. 85) finds that

> "since the hearings on the original reference (1926-27) the levels of Lake Michigan and of the other Great Lakes have risen",

Lakes Michigan and Huron approximately 3 feet 9 inches, Erie and Ontario during the said period exhibiting a corresponding relative rise in level. Consequently, there is now no interference to complainants' commercial, riparian and other interests due to the diversion at Chicago to the amount fixed by the March 3, 1925, permit. On the contrary, the said high lake levels have caused and are now causing and will cause damage to complainants' riparian interests, to docks, wharves, piers and other like structures. If complainants' contention is correct as to the effect of the Chicago diversion in lowering lake levels, the damage so caused would have been greater had such diversion not existed and therefore such damage will be greater if said diversion is reduced (Defts. Ex. 1456, Photographs showing conditions of high water and effect of same upon shore properties).

The hydrograph of the Great Lakes (Defts. Ex. 1447), showing the rise and fall of their elevations from 1860 to date, indicates that under ordinary circumstances such high lake levels extend over periods of from six to eight years. For instance, in 1881 when the levels of Lake Michigan reached approximately the elevation 582 (present level of Lake Michigan 582.4—Master's Report, p. 86), in the beginning of the year, they remained at the same elevation or higher until the latter part of the year 1888. During four years of that period, namely, from the beginning of the year 1883 to the latter part of the year 1886, they were always above 582, and during a considerable portion of such period they were above 583. From about the middle of the year 1875 to the end of the year 1878, they were substantially 582 or higher. From the beginning of the year 1860 to the end of the year 1863, except for a period of two months, they were always above 582. From the beginning of the year 1904 to the end of the year 1908, they remained substantially at elevation 581. From the middle of the year 1916 to substantially the end of the year 1920, except for short periods, they were near elevation 581.

In view of said high lake levels now existing, which in all probability will continue to exist for a number of years, the nine year period (ending December 31, 1938), fixed by the Master for the construction of all the sewage disposal works required, is too short. It appears from his report that he disregarded to some extent the testimony of defendants' witnesses as to the reasonably practicable period required for construction, and fixed the short period of nine years as the period of construction for all the works, in view of his conclusion that the Court by its opinion of January 14, 1929, intended to impose "an immediately heavy burden" upon the Sanitary District in the installation of said works (Master's Report, p. 80).

This conclusion as to the effect of the Court's opinion should not have been given weight since the said opinion was rendered with reference to low lake level conditions when there was a supposed immediate or existing injury to the complainants' commercial and riparian interests. The high lake level conditions removed any necessity for undue haste or the imposition of "an immediately heavy burden" in the installation of the sewage treatment works. Furthermore, in all likelihood, compensating works for lake levels may be constructed by the time high lake levels may recede, which works the Master found by his Original Report to be entirely feasible costing only a small sum, a reasonable portion of which expense the Sanitary District has offered to bear (Master's Original Report, p. 125).

(2) The program for the installation of sewage disposal works and their appurtenances, requires the expenditure of the huge sum of approximately $176,000,000. This program is made up of immense plants—Southwest Side Project costing approximately $71,000,000, West Side Project costing approximately $62,000,000, Calumet Project costing approximately $21,000,000 and other miscellaneous works costing several millions (Master's Report, pp. 10, 11). The magnitude of these plants almost surpasses the powers of imagination. Located upon areas of from 500 to 600 acres each for the largest plants, and each serving populations of 2,000,000 to 2,500,000 people or industrial waste equivalent population, they have no peers in the sanitary engineering art. The nearest approach to those two large projects (West Side and Southwest Side Works), is the Sanitary District's own North Side Project, upon which there has been expended $33,000,000 and will be expended to complete, the additional sum of $4,783,000 (Master's Report, pp. 7, 10), serving a population of 830,000 people and being the larg-

est activated sludge sewage disposal plant in the world. The Master should have extended the completion date fixed by him (ending December 31, 1938) for all the projects for a number of years to about January 1, 1945, to allow for necessary delays due to carrying on a number of vast construction projects at the same time by one organization, (the Sanitary District), and to acquiring sites for plants and rights of way through condemnation, and to delays necessarily arising in a municipal corporation's raising and providing moneys as and when needed for construction work.

(3) The decree of the Court if entered as recommended by the Master, fixing the amounts of the diversions in the interest of navigation and its protection at various times during the period of construction as important units in the construction program go into operation and at the end of the period when all the works are completed and in operation, would usurp the functions of the Secretary of War on the recommendation of the Chief of Engineers under section ten of Rivers and Harbors Act of 1899, and invade the Political and Administrative branches of Government contrary to the Constitution. However the Court can properly determine what works should be constructed and put in operation and the time for the completion of such works.

(4) The Master concluded that all the works installed, (December 31, 1938), to treat from a practicable standpoint all the sewage and wastes, will accomplish only 85 to 90 per cent purification of such sewage and wastes; that the population and equivalent population in trade wastes of the Sanitary District when the works are installed, will be approximately 6,000,000 people, and by 1945 approximately 6,800,000; that there will remain an effluent from these sewage purification works substan-

tially equal to the raw sewage of 10 to 15 per cent of the human population and equivalent population in industrial wastes served by such works, or equal to the untreated sewage of a city of 600,000 to 900,000 people; that it is impracticable to treat all the sewage at storm times; that at such storm times only 150 per cent of the dry weather flow may be, practicably, treated; that consequently at storm times, when the storm flow will range from 1½ to 7 times the dry weather flow, there will be large quantities of sewage wholly untreated that will not come in contact with or be treated by any sewage disposal works; that said effluent from said sewage purification works and sewage wholly untreated at storm times, must pass into the Chicago River and its branches and the various channels and canals of the Sanitary District; that complainants have not sought by their bills of complaint to enjoin the taking of water from Lake Michigan by the City of Chicago for the ordinary uses of its inhabitants; that as a matter of law, the City of Chicago is entitled to take its water supply from Lake Michigan for the ordinary and reasonable uses of its inhabitants; that when the City of Chicago sought to intervene in this case to assert its right of domestic consumption, complainants opposed such intervention and this was denied; that, if it is so entitled, then it cannot be said that the State or the City is subject to any established rule of law which requires it to turn into the Lake what is no longer water but sewage or the effluent of sewage treatment works (Master's Report, pp. 120, 121); that the effluents from the sewage treatment plants and the storm water must go somewhere; that with all flow stopped at Lockport, the said effluent from sewage disposal works, together with untreated sewage and waste carried with storm flow, discharged into the limited channels of the Drainage Canal and Chicago River, will create conditions in these channels seriously detrimental

to navigation; that the discharge of this effluent and storm water into Lake Michigan, even with circulating water through the Chicago River, would be incompatible with the interests of navigation in the Chicago Harbor, and there would be serious danger of contaminating the water supply and of creating offensive conditions at the bathing beaches of the city (Master's Report, pp. 136-140); that if the effluents from the sewage treatment plants and the storm water are taken away from the Lake, and discharged through the canal at Lockport, both the danger to the water supply will be removed and conditions suitable to navigation can be maintained; that under such conditions, 1,500 c. f. s. annual average from the Lake is required to maintain proper conditions for navigation; that the said 1,500 second feet annual average diversion from the Lake, in addition to domestic pumpage, would not produce

> "such a substantial injury to the complainants when the fluctuations of lake levels due to other causes than diversions are considered as to preclude attention to the serious consequences which may result from a failure to maintain suitable conditions in the interest of navigation in case all flow at Lockport should be terminated" (Master's Report, p. 140);

that this disposition of the problem by the discharge of the effluent from treatment plants and storm water, together with 1,500 cubic feet per second annual average from Lake Michigan, is

> "in accord with the equitable principles which appropriately govern the exercise of the jurisdiction to determine controversies between States, a jurisdiction which is unfettered by technicalities and in the last analysis is for the purpose of establishing substantial justice." (Master's Report, p. 139.)

It appears that there is navigation in the Chicago River or its branches which passes over and upon navigable waters of the United States south of the southern

terminus of the Drainage Canal, namely, upon the DesPlaines River, the Illinois and Michigan Canal and the Illinois River (Master's Report, pp. 122-123); that there will be required to maintain the waters of the DesPlaines River, Illinois and Michigan Canal and Illinois River in a condition reasonably acceptable for navigation when all the sewage disposal works are installed with the discharge of the effluent and storm water to the DesPlaines River, a total discharge, including effluent, storm water and diversion directly from the Lake, of approximately 5,000 cubic feet per second, or approximately 3,300 cubic second feet diversion from the Lake, in addition to pumpage, (1,800 cubic feet per second more than the 1,500 cubic feet per second that the Master allowed), (Master's Report, pp. 94-95).

Defendants contend that the Master should have found that said 3,300 cubic feet per second diversion in addition to domestic pumpage, will be required in the interest of navigation and its protection and that it would be a reasonable amount under all the equitable considerations involved, and that said 3,300 cubic feet per second, in addition to domestic pumpage, would be a reasonable riparian use of the Great Lakes waters.

(5) Even considering only that navigation which plies in and about the Port of Chicago and the various waters thereof and enters the Chicago River from Lake Michigan, or passes from the Chicago River into Lake Michigan, according to the weight of the evidence, a mean annual diversion of 2,000 cubic feet per second in addition to domestic pumpage instead of 1,500 cubic feet per second in addition to domestic pumpage, as allowed by the Master, will be required when all the sewage purification works are installed, and such amount is a reasonable amount under all the equities of the case (Special Master's Report, pp. 131-132).

(6) It is impracticable at this time to determine the amounts of diversion that may be required in the interest of navigation and its protection at the end of the construction period for the sewage disposal plants and at various times during the construction period when the important units of the program go into operation (Joint Abst., 69-70, 74). Therefore, the Master should have provided by the decree for the determination of such amounts at such times, or that the determination of such amounts at such times should be made by the Secretary of War upon the recommendation of the Chief of Engineers, being the officers of the United States particularly qualified by reason of training and experience, and provided with the equipment of their departments, to make such determinations.

COMPLAINANTS' CONTENTIONS ON THEIR EXCEPTIONS.

(1) Complainants do not except to the findings of the Master with respect to the time of completion of the different sewage disposal works, nor do they except to the construction period for placing in operation all of said works, as recommended by the Master, December 31, 1938.

(2) Complainants have not excepted directly to the conclusions of the Master (Master's Report, p. 139) that the disposition of the problem by the discharge of the effluent from treatment plants and storm water, together with a reasonable diversion of water from Lake Michigan (1,500 cubic feet per second annual average) through the Main Channel of the Sanitary District to the DesPlaines River, is in accord with the equitable principles which govern this Court in determining similar controversies; and that (Master's Report, p. 140) the 1,500 feet annual average diversion from the Lake in addition to domestic

pumpage, would not produce such a substantial injury to the complainants under all the circumstances of the case as to preclude attention to the serious consequences which may result from a failure to maintain suitable conditions in the interest of navigation, in case all flow at Lockport should be terminated.

On February 3, 1930, pursuant to the order of Court, exceptions were filed by all the complainants. On February 24, 1930, New York obtained leave to withdraw its exceptions and substitute other exceptions. The exceptions thus substituted by New York are substantially similar to the exceptions filed by all the complainants on February 3, 1930, except that New York does not object to the conclusion of the Master that the effluent from sewage disposal works should be discharged through the Drainage Canal to the DesPlaines River. This action of New York in thus substituting the said exceptions is in harmony with the statement of Attorney General Ward of New York in oral argument before the Master that

> "Chicago should be left to say whether it wants to turn its sewage into its water supply. Certainly the complaining states do not want Chicago to turn its sewage into this water supply. That is our water supply as well as Chicago's." (Joint Abst., 676).

(3) Complainants' exceptions, however, raise almost every issue of fact that was before the Special Master on re-reference, except, as before stated, the issue involving the time of construction of the different units of and of the entire construction program. Their exceptions on the facts apparently fall into three general heads.

The *first* general head relates to the failure of the Master, as they say, to include as a part of the practical measures to dispose of the sewage of the Sanitary District other than by Lake diversion, the installation by the

City of Chicago (not a party to the suit) of a different water supply system, namely, the extension of intake tunnels many miles further into the Lake, or the construction of one super tunnel in place of the other intake tunnels, and the installation of filter plants for the entire water supply of the city, including works for chlorination of the water supply, (which works would cost the City of Chicago upwards of $80,000,000 to $140,000,000—Joint Abst., 522, 618, 637); the installation by the City of Chicago of an entirely separate sewer system to collect only the sewage from houses and buildings, the present sewers carrying the storm water, (costing approximately $400,000,000—Joint Abst., 371-387); provision by the Sanitary District for the chlorination of the effluent of sewage disposal works, and construction of outfall sewers or tunnels from the respective sewage disposal plants many miles to the Lake to divert the effluents wholly from the Chicago River and its auxiliary channels directly to the Lake, or the utilization of existing pumping stations or construction of new pumping stations to provide circulating water for the Chicago River and its auxiliary channels from Lake Michigan through such channels and then back to the Lake; and the provision by the Sanitary District for passing through the Imhoff tank part or preliminary settling tank part of the sewage disposal works, not, a volume at storm times equal to 150 per cent of the dry weather flow found by the Master to be the amount practicable, but a volume at such storm times equal to about 4,000 c.f.s., which is about 2¼ times the ordinary dry weather flow.

These works and provisions which complainants claim should have been included by the Master as part of the practical measures to dispose of the sewage of the Sanitary District, were never urged by the complainants to be a part of any such practical measures, but on the con-

trary, complainants by their findings stated with reference to all such works and provisions in substance that "the construction or installation of any such additional works or structures should be left to the discretion of the defendants" (Joint Abst., 666).

The Master found the works to be installed to provide a practicable method or program for complete treatment, to be the very works mentioned in Complainants' Requested Finding VIII (Joint Abst., 665).

The *second* general subdivision of their exceptions to the Special Master's Findings of Fact, relates to the Master's conclusions that, after the installation of controlling works and after all sewage treatment works have been installed, the diversion should not exceed an annual average of 1,500 c.f.s., in addition to domestic pumpage (Master's Report, p. 143); that such controlling works, either at the north end of the Drainage Canal or at the mouth of the Chicago River, should be installed by the Sanitary District after the Secretary of War, on the recommendation of the Chief of Engineers, has approved the plans (Master's Report, pp. 142-143); that the diversion should not be reduced during the construction period below 5,000 c.f.s., until such controlling works are installed (Master's Report, p. 143); that the question of pumpage from the Lake by the City of Chicago and other municipalities for the ordinary domestic purposes, is merely incidental to that relating to the diversion as the bills were only brought to restrain the Sanitary District from abstracting water from Lake Michigan, and the State has not been called upon to answer on the theory that the mere taking of water by the City of Chicago for the ordinary uses of its inhabitants, constituted an actionable wrong (Master's Report, 120); that the City of Chicago, under authority of the State, has the

riparian right to take water from Lake Michigan for the ordinary uses of its inhabitants, and there is no question before the Court as to any abuse of that right (Master's Report, p. 121); that, the City of Chicago having the right to take its water supply for ordinary domestic purposes, it will not follow that there is any rule of law which requires it to turn into the Lake what is no longer water but sewage or the effluent of sewage treatment plants (Master's Report, p. 121); that there are no means known at present of otherwise disposing of the effluent from the sewage treatment plants when they are in operation, and, therefore, such effluents must be turned into the Drainage Canal and Chicago River and thence to be discharged at Lockport, the western terminus of the Main Drainage Canal, or be carried into Lake Michigan (Master's Report, pp. 121-122); that such navigation as now passes from the Drainage Canal to the DesPlaines River and the waterways south, would be cut off by a complete stoppage of flow at Lockport (Master's Report, p. 122); that pollution of navigable waters caused by the introduction of sewage has relation to the interest of navigation (Master's Report, 126-127); that storm flow, which cannot be taken care of by the sewage treatment plants, will pass into the Chicago River and the Canals of the Sanitary District and will contain sewage and wastes untreated (Master's Report, p. 35); that it is far from demonstrated that with all flow stopped at Lockport, the concentration of such a vast volume of effluent as will flow from the sewage plants, together with untreated sewage and wastes at storm times, into the limited channels of the Drainage Canal and Chicago River, will not create conditions in these channels seriously detrimental to navigation (Master's Report, p. 137); and that, if the effluent from the sewage treatment plants and storm water are to be discharged through the Drainage

Canal at Lockport, some flow of water from the Lake, (about 1,500 c.f.s, in addition to pumpage), will be required in the interests of navigation in the Chicago River as part of the Port of Chicago (Master's Report, p. 138).

The *third* general subdivision of complainants' exceptions to the findings of fact, relates only to the Master's statement "no recommendation is made as to costs" (Master's Report, p. 145).

The complainants also except to the failure of the Master to find as requested by them, but inasmuch as these relate to the exceptions to particular findings of fact, above mentioned, it is unnecessary to point them out here.

(4) The failure of the Master to conclude with reference to the law, as requested by the complainants, is also the subject of certain exceptions. The conclusions of law requested by complainants and refused by the Master to which exceptions are taken are in substance as follows: that the defendants should cease all flow or diversion at Lockport at the end of the construction period for all the treatment plants (Joint Abst., 669); that the discharge of liquid sewage or street wash into navigable waters of the United States does not constitute an obstruction to or interference with navigation or impairment of navigable capacity (Joint Abst., 670); that the discharge by the defendants of the domestic pumpage and/or the runoff of the Chicago and Calumet River basins to the Des Plaines River, constitutes an illegal diversion (Joint Abst., 670); that, upon the completion of the program of practicable measures for the disposing of the sewage of the Sanitary District of Chicago by other means than Lake diversion, no diversion or flow at Lockport may be lawfully maintained (Joint Abst., 671); that the effluents

from the treatment plants when the construction program is completed should be discharged by such methods as will remove all said effluents from the Chicago River and the navigable channels of the Sanitary District of Chicago and provide for the discharge of such effluents into Lake Michigan or elsewhere in such manner and at such places as will not create any obstruction to or interference with navigation or the navigable capacity of any of the navigable waters of the United States (Joint Abst., 672); that complainants are entitled to a decree enjoining the defendants, their agents, etc., from diverting any water and from maintaining any flow through the controlling works at Lockport subsequent to the date when the entire construction program is completed.

(5) With complainants' exceptions and apparently as part of same, complainants have submitted "Requested Form of Decree" "to carry out the exceptions • • • taker to the Report of the Special Master." (Their Exceptions, p. 37 *et seq.*)

Defendants' form of Decree submitted to the Special Master is still the one that defendants urge (Joint Abst., 653-660). It finds what works should be installed to treat the sewage and wastes, from a practicable standpoint, substantially as found and recommended by the Special Master (Master's Report, pp. 146-147). The dates of completion of the different important units of construction program and for all the works (Jan. 1, 1945), are set forth in the form of decree submitted by defendants, (Joint Abst., 659). The form of Decree provides for the Court's retaining jurisdiction until all the works are put in operation. The amounts of the diversion, from time to time during the construction period and at the end of the period, are to be fixed by the Secretary of War on the recommendation of the Chief of Engineers, and there are no mandatory or coercive terms provided. It

is considered that the mere finding of the Court, as to what works should be installed and the time within which they should be put in operation, is sufficient, considering the character of the parties before the Court (*Virginia* v. *West Virginia*, 246 U. S. 565).

DEFENDANTS' POINTS TO SUPPORT THEIR EXCEPTIONS AND TO MEET COMPLAINANTS' EXCEPTIONS TO THE SPECIAL MASTER'S REPORT ON RE-REFERENCE.

(1) The bills of complaint do not seek to interfere with the discharge of Chicago's sewage, wastes and storm water to the DesPlaines River.

(2) The Supreme Court Opinion of January 14, 1929, does not contemplate preventing discharge of sewage effluent, wastes, storm water and rain water runoff to the DesPlaines River, nor does it intend that diversion from the Lake should cease.

(3) The City of Chicago has the right to take water from Lake Michigan for its domestic purposes and discharge the drainage, sewage or effluent or wastes from sewage purification works wherever in its judgment it may seem most appropriate.

(a) The Supreme Court, in original suits between States, adopts the law of complainants and defendants as announced by the Constitution, Statutes or opinions of their courts.

(b) The law of the complainant and defendant States is that a city located upon a public navigable waterway has the right to take water for its domestic purposes and appropriate it for all the uses to which the city may put it, such as drinking, cooking, sanitary, manufacturing, fire department and such like, either as riparian owner or by virtue of a grant by the State of such use of public waters, and no lower or other

riparian owner can complain of such use for domestic purposes.

(c) The law of other States is similar.

(d) Diversions of water from one watershed to another have been the common practice of complainant states.

(e) For approximately 65 years, (since about 1865), there has been discharged to the DesPlaines River by way of the Illinois and Michigan Canal or the Sanitary and Ship Canal and from the Chicago River, an amount of sewage, waste and water equal to the average rain water runoff of the Chicago River drainage area and the sewage and wastes (Chicago's pumpage).

(4) After the works recommended in the Special Master's report for the treatment of sewage and wastes have been installed, then there will have been disposed of and eliminated, all the sewage and wastes that may be so eliminated and disposed of from a practicable standpoint. There will be left a residue in the effluents and in storm water after such works are put in operation. Therefore, a reasonable amount of water will be required and may be diverted from Lake Michigan to appropriately prevent nuisance to or interference with navigation or navigable waters in the port and harbor of Chicago and in Lake Michigan, to prevent pollution and impairment of the domestic water supply, impairment of bathing beaches and to prevent other nuisances.

(a) The Court in exercising its jurisdiction in controversies between States, will apply the principle of comity and equality of right and opportunity, and such equitable principles as will effect a just and equitable solution of the problem under all the circumstances of the case.

(b) The natural and logical place for the discharge of

the effluent, wastes and drainage of the Sanitary District, including the untreated sewage and storm waters, with a reasonable amount of Lake water to avoid nuisance and impediment to navigation, is the DesPlaines River.

(5) The practicable measures required for the disposition of the sewage and wastes of the Sanitary District of Chicago, do not embrace the construction, installation and placing in operation of filter plants by the City of Chicago for its water supply, the extension of intake tunnels or the construction of a super tunnel or the building of a separate sewer system, the provision by the Sanitary District for the chlorination of the effluent of sewage disposal works and construction of outfall sewers or tunnels from the respective sewage disposal plants to the Lake, or the utilization of existing pumping stations or constructing of new pumping stations to provide circulating water for the Chicago River and its branches, or the provision by the Sanitary District for passing through Imhoff tanks or preliminary settling tanks a volume at storm times in excess of 150 per cent of the dry weather flow.

(a) These works were never urged by the complainants to be a part of the practicable measures for the disposition of the sewage of the Sanitary District other than by Lake diversion.

(b) The said works if installed would be impracticable.

(6) Pollution of navigable waters caused by the introduction of sewage has relation to the interests of navigation.

(a) The evidence is overwhelming in support of this proposition.

(b) Considering the interests of navigation on the Illinois River, as well as that at the Port of Chicago,

the evidence is undisputed that approximately 5,000 c.f.s., including domestic pumpage, is required to maintain unobjectionable conditions on the Illinois River.

(c) Considering only the waters of the Port of Chicago, 2,000 c.f.s., in addition to pumpage, is required for navigation.

(7) The provision for controlling works at the mouth of the Chicago River or at or near the northern terminus of the Drainage Canal to prevent reversals of the Chicago River into the Lake is part of the defendants' construction program to provide practical measures in order that the amount of water diverted from the Lake, when all the works are in operation, may be reduced to the lowest practicable amount consistent with the interests of navigation and prevention of nuisance to the various interests involved.

(a) The complainants never contested by evidence or otherwise the practicability of said controlling works being provided as a part of the program of practical measures for the disposition of the sewage and wastes of the Sanitary District by means other than Lake diversion.

(b) The complainants first proposed controlling works as a part of the program for practicable measures in the 1926-27 hearings, and their witnesses in the hearings upon re-reference testified on the assumption that such controlling works should be provided.

(c) Unless such controlling works are installed, it will be impracticable, as the Master found, to reduce the diversion below 6,500 cubic seconds feet.

(d) The Drainage Canal and the Chicago River are navigable waters of the United States and it will be necessary that, before such controlling works may be in-

stalled, the plans therefor shall be approved by the Secretary of War on the recommendation of the Chief of Engineers under Section 10 of the Rivers and Harbors Act of March 3, 1899.

(e) The Master has found that such controlling works will not materially interfere with navigation, and has provided by his form of decree that the defendant Sanitary District shall immediately submit plans to the War Department for such control works and that the control works shall be constructed and installed by the Sanitary District within two years after the date of the approval of such plans by the War Department. Consequently, an exception on any prognosis that they may not be built is without merit.

(8) The amounts of the diversion at various times during the period of construction as the different important units of the sewage disposal construction program go into operation, and the amount of diversion at the end of the period of construction after all the works are completed, should be fixed by the Secretary of War, on the recommendation of the Chief of Engineers.

(a) The Opinion of January 14, 1929, herein intends that the Secretary of War, on the recommendation of the Chief of Engineers, shall continue the exercise of the functions heretofore exercised in fixing the amounts of the diversions in the interests of navigation and its protection as the exigencies of the situation may prompt.

(b) The Court ought not to take any action in fixing the amount of the diversion from time to time which will invade the sphere of action of the Political Department. The Court's Opinion of January 14, 1929, must not be so construed and if it may bear such construction, it should be modified.

(c) It is impracticable now to fix the amount of the

diversion during the construction period and at the end of the period. The practical solution with due regard to the statutory functions of the Secretary of War on the recommendation of the Chief of Engineers, and to the usual judicial powers of this Court, is to provide by the decree that the diversion shall be, during said construction period and at the end of said construction period, such amounts as may be determined by the permit or permits of the Secretary of War on the recommendation of the Chief of Engineers; but such permits shall be subject to review by this Court on the evidence already submitted and any further evidence that may then be presented.

(9) The time fixed by the Master's Report for the installation of all the different works is too short.

(a) The rise in Lake levels since the introduction of the evidence on which the Court's opinion, (January 14, 1929), was rendered should have caused the Master to disregard his conclusion that the Court by its said opinion intended to impose "an immediately heavy burden" in the installation of said works. Consequently, the reasonable time for completion should have been allowed. The shorter time which would impose such immediately heavy burden is inequitable under the circumstances.

(b) Liberal allowance for unforeseeable delays, in the construction of such vast and unusual works, should have been made which would have extended the construction period beyond the date, (December 31, 1938), fixed by the Master.

(10) It is inappropriate at this time to determine which one of the parties shall pay the costs.

ARGUMENT.

PRELIMINARY STATEMENT.

After the opinion of the Supreme Court was delivered January 14, 1929, upon the Master's Original Report and the Exceptions thereto filed by the complainants, the Special Master set the hearings on the re-reference to begin March 25, 1929, at Chicago. Prior to that time the Special Master indicated that the Sanitary District should first proceed with its evidence and disclose its program of practicable measures for the disposition of the sewage and wastes of the Sanitary District embraced within the order of re-reference.

At the beginning of the March hearings, the Special Master inspected the North Side Sewage Treatment Plant then in operation and the West Side Sewage Treatment Plant under construction, which is important to be borne in mind in connection with the consideration of complainants' exceptions to findings of fact.

Pursuant to the Master's request, General Jadwin, then Chief of Engineers, United States Army, and other officers of the Corps of Engineers, were present at the beginning of the hearings on re-reference. General Jadwin was called to testify principally on the question

> "with regard to the extent of the flow from Lake Michigan, if any, that would be necessary to maintain navigation in the Chicago River in the event that all diversion for the purpose of taking care of the sewage of the Sanitary District were discontinued." (Master's Report, p. 90).

His answer to that question appears at pages 91 to 96, both inclusive, of the Master's Report.

The defendants then proceeded with their evidence

on the re-reference and submitted witnesses who testified as to the program for sewage disposal which their witnesses had outlined to comply with the order of re-reference and the Court's Opinion of January 14, 1929. The program for the installation of works to provide the practical measures is set forth in the Master's Report, pp. 5-17, both inclusive. This program provides for the construction, installation and completion of various artificial sewage treatment works which are unnecessary to be described in detail. It also provides for the installation of controlling works either at the mouth of the Chicago River or at the northern terminus of the Drainage Canal, to prevent reversals or flow of the Chicago River into Lake Michigan. This construction program will require the expenditure of approximately $176,000,000, in addition to, approximately, $75,000,000 already expended, (or obligated to be paid), for artificial sewage disposal (Master's Report, pp. 7, 10, 11).

The complainants did not criticize materially the construction program so laid out to provide the practical measures to dispose of the sewage as is indicated by the statement of their principal witness, Mr. Howson (Master's Report, p. 19):

> "That is substantially the program, as I understand it, outlined by the engineers for the Chicago Sanitary District, which I believe to be a good program, well adapted to meet the conditions.
>
> No major modifications of the program of the Sanitary District to achieve the best practical sewage disposal so far as the plants themselves are concerned are necessary."

According to this program put forward by the Sanitary District and admitted to be "a good program" by the complainants, the sewage and wastes arising within the area of the Sanitary District may be treated at ordinary times to 85 per cent or 90 per cent of complete

and entire theoretical disposition. There will be left a residue of about 15 per cent in the effluent from the sewage purification plants, which 15 per cent in nature and extent, is substantially equal to the raw sewage of 15 per cent of the population and wastes treated. At all storm times when the storm flow exceeds 150 per cent of the ordinary dry weather flow, there will be a large volume of storm water carrying raw sewage, street and other wastes, totally untreated, going directly into the canals and waterways within the limits of the Sanitary District (Master's Report, p. 35). This effluent from the purification works and the storm water with the raw sewage must go somewhere, and the only place it may go is into the rivers, canals, channels and waterways within the limits of the Sanitary District. By so doing it will impair navigation, whether such effluent and storm water is discharged from the Drainage Canal to the DesPlaines River or from the Chicago and Calumet Rivers into Lake Michigan or by means of tunnels direct to the Lake from the different plants. In the former case, the rivers and canals carrying the sewage effluent and storm waters to the DesPlaines River, the DesPlaines and Illinois Rivers will be impaired for navigation purposes. In the latter cases the rivers and canals carrying the sewage and storm water to Lake Michigan and Lake Michigan itself will be impaired for navigation purposes by reason of this discharge. The flushing of the Main Channel of the Sanitary District from Sag and the West Fork and South Branch of the Chicago River and the flushing of the North Shore Channel and North Branch of the Chicago River and the Chicago River by means of pumping water from the Lake through the Calumet Sag Channel and the North Shore Channel, will not eliminate impairment of navigation (Master's Report, pp. 136-140).

When defendants proceeded with the offering of evidence on the re-reference, the complainants by their cross-examination of defendants' witnesses and by the questions put to their own witnesses on direct examination, indicated that they proposed, which they had not done before, to seek a decree restraining the defendants from discharging anything of any kind from the Drainage Canal at Lockport; that is, to prevent defendants from discharging the sewage and wastes or effluents from sewage treatment plants, including storm water with untreated sewage, when the construction program should be finished, away from Lake Michigan to the DesPlaines River. Complainants also objected to the discharge at Lockport or the withdrawal from Lake Michigan of any water from the Lake to maintain unobjectionable conditions for navigation in the waters of the Port of Chicago or in the waters of the DesPlaines and Illinois Rivers.

This was also contrary to the attitude which the complainants had taken in the hearings which preceded the Master's Original Report—1926-27—when they had as part of their program presented an alternative program for the disposition of the sewage and wastes which included the operation of controlling works, above mentioned, at or near the northern terminus of the Drainage Canal. These control works when operated, as the evidence shows, will require the abstraction of a certain amount of water from Lake Michigan in order to properly and effectively carry the dirty, sewage-laden storm water untreated by sewage purification works, away from the Lake to the DesPlaines River (Joint Abst., 281-294, 295-304).

The complainants also contend that if the effluent and storm water may be discharged under the law and the facts in the case to the DesPlaines River, and a reason-

able amount of water is required from the Lake in the interests of navigation and its protection, then the amount of such diversion or abstraction of water shall be fixed by the decree of the Court. We do not understand, however, that, under such circumstances, the complainants now object or except to the amount of the diversion as fixed by the Master, 1500 c.f.s. in addition to pumpage.

After all the works in the sewage treatment program are in operation, the effluents from these treatment works and the untreated sewage in storm flow at storm times must go into the channels of the Chicago River or the Canals of the Sanitary District. By such discharge of said wastes into said river channels and canals, the navigable waters will be obstructed in some manner, and this obstruction to navigable waters must take place, for there is no other place for these wastes to go. If the wastes are discharged from the said rivers and canals into the Lake, the obstruction to navigation will embrace the waters of said Chicago River and the Canals of the Sanitary District and also Lake Michigan. If the said wastes are discharged from said rivers and canals by means of the Main Drainage Canal of the Sanitary District to the Des Plaines River, the obstruction will embrace the waters of the said rivers and canals and the DesPlaines and Illinois Rivers. However, it must be borne in mind that the said DesPlaines and Illinois Rivers will be obstructed to some extent by discharge of wastes from other cities and towns located along them.

It must necessarily follow that the manner and conditions of the discharge and flow of said wastes in the navigable waters must be within the paramount power of Congress to regulate. Congress has provided the regulation to be made by the Secretary of War on the recommendation of the Chief of Engineers. It would there-

fore be improper for the Court to step over into the field of action of the political department to determine these very questions that are committed to the Secretary of War.

It is our contention as one of the fundamentals of this case that many of the questions relating to the amount of the diversion are entirely irrelevant to the solution of the problems which the Court may properly consider. So, when we discuss some of these questions which are necessarily irrelevant under our theory of the power of the Secretary of War, we do so merely for the purpose of meeting the arguments of complainants thereon.

Point I.

THE BILLS OF COMPLAINT DO NOT SEEK TO INTERFERE WITH THE DISCHARGE OF CHICAGO'S SEWAGE, WASTES AND STORM WATER TO THE DES PLAINES RIVER.*

The suits here were instituted against the State of Illinois and the Sanitary District. The City of Chicago, obtaining its water supply directly from the Lake by means of intake tunnels and waterworks system, and discharging sewage and wastes by means of its sewer systems into the waterways and canals within the limits of the Sanitary District, was not made a party. The complainants did not seek to disturb the then existing situation which permitted Chicago to have through the operation of the canals of the Sanitary District, its sewage and wastes kept out of the Lake, its only water supply. The bills were directed against the permit of March 3,

* NOTE: When we speak of Chicago sewage or wastes or water supply in this brief, for convenience it will include any other cities, towns or villages within the Sanitary District which directly take water from the Lake for ordinary domestic purposes and discharge sewage and wastes through their sewer systems, for the reason that a number of such cities, towns and villages obtain their domestic water supply from the Chicago Waterworks System. The amount of domestic pumpage by these municipalities is small, about 60 c.f.s., (Joint Abst., 87).

1925, which authorized a diversion of 8500 *c.f.s. exclusive of pumpage.* The Master found.

> "These bills were brought to restrain the abstraction of water from Lake Michigan by the Sanitary District. * * * In its opinion this Court described these bills as brought 'for an injunction against the State of Illinois and the Sanitary District of Chicago from continuing to withdraw 8500 cubic feet of water a second from Lake Michigan at Chicago.' (278 U. S. 367, 399.)" (Master's Report, p. 120.)

An examination of the bills of complaint discloses that they nowhere complain of the discharge of sewage and wastes. These bills contain substantially the same allegations. In referring to the Main Canal of the Sanitary District, it is alleged (paragraphs 12 and 13 of the Wisconsin Bills, paragraphs 10 and 11 of the New York Bill and paragraphs 12 and 14 of the Michigan Bill):

> "It was at all times the plan of the defendant State of Illinois and the defendant Sanitary District of Chicago, that the said Canal should be used as a passageway for the sewage of the territory comprising the Sanitary District of Chicago, to the end that such sewage might be carried down the said Canal into the DesPlaines and Illinois Rivers, and in order to accomplish the said purpose, it was the intention of said defendants at and prior to the commencement of the construction of said Canal, *to divert from Lake Michigan and pass through said Canal, such amounts of water as might be deemed by said defendants to be necessary for the proper dilution of the said sewage and its propulsion through the Canal and the DesPlaines and Illinois Rivers.*
>
> * * * * * *
>
> *And thereupon, on or about the 2nd day of January,* 1900, *said defendant District commenced the diversion of water from Lake Michigan into the Chicago River.*
>
> * * * * * *
>
> *that the only source from which water in such quantities as required by said act could be obtained was by the diversion of water from Lake Michigan."*

Paragraphs 27 of the New York Bill and 31 of the Michigan Bill allege that the acts of the defendants

> *"in abstracting water from the Great Lakes basin, * * * and diverting them into the Canal * * *,*
> are in violation of the legal rights of complainant."

The Michigan Bill further alleged that neither Congress nor any Federal agency or authority, nor the State Legislature, has the power

> *"to abstract from the Great Lakes basin any water to be diverted into any other natural or artificial watershed, whether for the purpose of operating, maintaining and flushing an open sewer maintained in violation of modern standards of sanitation, or even for the purpose of navigation."*

The prayer of the first paragraph of all three bills of complaint was for an injunction against the defendants State of Illinois and the Sanitary District from taking or causing to be taken,

> "any water whatever from Lake Michigan."

The Wisconsin Bill further prayed that in the event the Canal

> *"shall be used as a navigable waterway of the United States and subject to the same control on the part of the United States as the other navigable waterways thereof,"*

then the defendants should be restrained

> "from taking or causing to be taken, any water from Lake Michigan * * * in excess of the amount which the Court shall determine to be reasonably required for the purpose of navigation in and through said Canal and the connecting waters to the Illinois and Mississippi Rivers, without injury to the navigable capacity of the Great Lakes and the connecting waters thereof."

The Wisconsin Bill also asked that defendants be restrained

> *"from dumping and draining into the said Sanitary District Canal any sewerage or waste in such quan-*

tity and manner as to excessively pollute and render the Sanitary District Drainage Canal, the Chicago, DesPlaines and Illinois Rivers unsanitary, pestilential and dangerous to the health, safety and comfort of the people of the complainant states navigating said rivers."

Complainants did not complain of the discharge of sewage to the DesPlaines River through the Sanitary Canal. Their own Exhibit 17, letter of the Secretary of State to the British Embassy of November 24, 1925, states that the Government considered the diversion by the Sanitary District and the domestic pumpage and discharge of sewage to the DesPlaines River, to be entirely separate (Joint Abst., filed Jan. 24, 1928, 181):

> "Diversion of water for domestic consumption in the City of Chicago being purely a function of the municipal government of the city, it is considered that the authority granted the Sanitary District could not be made to apply to or include this other diversion as well. The case before the Secretary of War for action involved the granting of a permit for diversion of water for sanitary purposes only, and the instrument of authority was worded accordingly."

In any event, the sewage and rain water runoff of the Chicago River watershed has been since the year 1865 to the present time, discharged to the DesPlaines River by means of the Illinois and Michigan Canal or by the Sanitary Canal. The amount diverted from time to time up to 1900, is shown from the following statements from the Master's Original Report (November 23, 1927):

> (Master's Original Report, p. 12). "Originally, only enough water was pumped to answer the needs of navigation.
>
> * * * * *
>
> In the same year, (1865) for the immediate relief of the city, an arrangement was made by the municipal authorities by which the canal commissioners agreed to pump water from the river in excess of

the needs of navigation. This pumping was done chiefly in the summer and early fall and the usual rate was 200 cubic feet per second, or a little less."

(Master's Original Report, p. 13): "In 1879, there was a lakeward current for thirty days, and no perceptible current either way for ten days. The mean flow was less than 300 c.f.s. The canal was grossly polluted.

In 1881, the legislature of Illinois (Illinois Laws, 1881, p. 159) passed a resolution * * * authorizing the installation of pumps at Bridgeport, the northern terminus of the canal, with a capacity of not less than 1,000 c.f.s. * * * For a few years, this afforded sufficient dilution in the canal. But at that time, Lake Michigan stood at a high stage, and the pumps had sufficient capacity to provide 1,000 c.f.s. only under that condition. In 1886, the lake level began to fall, and it continued to fall, until in 1891 it was about two feet lower than when the pumps were installed. Their capacity was thus reduced to a little more than 600 c.f.s. As the city continued to grow, the nuisance along the canal was at times as bad as ever."

Since 1900 the amount discharged to the DesPlaines River is shown by the table appearing in the Master's Original Report (pp. 22-23). The annual average rainwater runoff of the Chicago River Drainage Area under natural conditions would be approximately 193 c.f.s. Under present conditions, because of built-up areas, the Chicago River Drainage Area runoff annual average is 256 c.f.s. The Calumet watershed runoff annual average under natural conditions would be approximately 273 c.f.s. Under present conditions of built-up areas it is 287 c.f.s The domestic pumpage in cubic feet per second by the City of Chicago ranged from 11.8 c.f.s. in 1865 to 485 c.f.s. in 1899 (Joint Abst., 86-87). The domestic pumpage from 1900 to 1926 is shown by the Master's Original Report (pp. 22-23) to have been 449 c.f.s. in 1900 and 1395 in 1926. In 1929 it was 1625 c.f.s. (Joint Abst., 87).

Thus, it is apparent from the above statements from the Master's Original Report, that since 1865 at substantially all times an amount of sewage and water has passed through the Illinois and Michigan Canal and/or the Sanitary District Drainage Canal to the DesPlaines River, equal to or exceeding the amount of domestic pumpage and the average annual rainwater runoff of the Chicago and Little Calumet River Drainage Areas. Obviously, the complainants could not seek successfully to stop the long standing and acquiesced in discharge of these quantities of sewage and rainwater runoff to the DesPlaines River.

It necessarily follows that when the sewage disposal works are completed and placed in operation according to the program of the Sanitary District and admitted to be "a good program" by complainants, there is no complaint as to the discharge of the effluent and storm water from Lake Michigan to the DesPlaines River.

The prayer of the Wisconsin bill does not seek to enjoin that portion of the diversion which is required or necessary in the interest of navigation, when

> "the canal constructed by the defendant District shall be used as a navigable waterway of the United States and subject to the same control on the part of the United States as other navigable waterways thereof."

The Sanitary District Canal connects the upper basin of the Illinois and Michigan Canal at Joliet with the West Fork of the South Branch of the Chicago River, navigable waterways of the United States, and has been used and has been devoted to through waterway traffic between Chicago and points along the DesPlaines, Illinois and Mississippi Rivers. It replaced the old Illinois and Michigan Canal as to the section between Chicago and Joliet. *Mortell* v. *Clark*, 272 Ill. 201. The Sanitary

Canal is necessarily a navigable water of the United States and under its control, as other such waterways are. In *Ex parte Boyer*, 109 U. S. 629, the Court held the Illinois and Michigan Canal to be "public water of the United States."

The Wisconsin bill seeks to enjoin merely the Sanitary District dumping and draining

> "any sewerage or waste in such quantity and manner as to excessively pollute and render the Sanitary District Drainage Canal, the Chicago, DesPlaines and Illinois Rivers unsanitary, pestilential and dangerous to the health, safety and comfort of the people of the complainant states navigating said rivers, or to injure or destroy the property of the people of the complainant states navigating said rivers and waterways."

This clause of the prayer of the Wisconsin bill admits that the deposition of sewage and wastes in waterways may be injurious to navigation, and seeks merely to compel the Sanitary District to provide practicable artificial sewage disposal plants to purify its sewage. It is clearly recognized by the prayer of the bill above mentioned that whatever water may be required in the interest of navigation after such purification works are constructed and placed in operation to render such waters suitable for navigation, should be provided from Lake Michigan. There is no thought that the method so long used by Chicago of discharging its waste to the DesPlaines River, should be stopped.

Pursuant to these bills of complaint, much evidence was offered by complainants at the 1926-27 *hearings, and their witnesses at those hearings never contemplated discharge of treated or untreated sewage and storm waters into Lake Michigan.*

On the question of nuisance and danger to water supply by flood waters going into the Lake, the report of

Alvord, Burdick & Howson to the Secretary of War of April 16, 1925, states (Master's Ex. B):

> "A large flood on the Calumet and Chicago Rivers will undoubtedly wash great quantities of filth into Lake Michigan. * * * No practicable means for sewage purification will place these streams in condition where their waters may be periodically flushed into the water supply of the region even occasionally, with safety to the water supplies." (Joint Abst., 164.)
>
> "It must be a part of any scheme for sewage disposal that the water supply should be protected against any possibility of sewage contamination.
>
> In the Chicago region the means has been provided through the drainage canal by which the great majority of all impurities are diverted from Lake Michigan." (Joint Abst., 161, 162.)

Mr. Ellms (complainants' witness) subscribed to the Report of March, 1926, of the Municipal Research Bureau of Cleveland, as follows:

> "Only a part of the general pollution of Lake Erie can be controlled. If sewage is given the most refined treatment known in the present state of the art, pollution of the water would still be extensive. Surface wash is said to contribute a considerable part of pollution. There is no known method of treating it." (Joint Abst., 628.)

The witness also agreed with the following statement appearing in the Canadian Engineer on April 30, 1926, paper entitled: "Pollution of Boundary Waters, Problems of Cities on Great Lakes":

> "But it must also be realized that there must be a limit to the ability of purification processes to make safe, from a sanitary standpoint, waters which have once been contaminated.
>
> The cities on the Great Lakes are in a peculiar position regarding the water supply and sewage disposal. They are all of them fouling their own nests. Whether they realize it or not, the problems of a safe water supply and the proper and adequate treatment of their sewage are so intimately related

that one can not be solved without solving the other." (Joint Abst., 631.)

Gascoigne, complainants' witness, testified (Joint Abst., 650) that he subscribed to his paper, regarding Cleveland sewage disposal and water supply problem, in which he stated:

> "In the matter of disposing of the sewage of the city, we are not as favorably situated as the City of Chicago in having available a back yard into which we can discharge our filthy sewage or used water supply. If we were so situated, there is no question in my mind about the wisdom of our taking advantage of such an asset."

Complainants' witnesses, in the original hearings, were asked the following hypothetical question (Joint Abst., 620, 637, 649):

> "Q. Assuming complete treatment of all of the sewage of the Sanitary District of Chicago, with no normal diversion of water from Lake Michigan, but with the diversion of all sewage and storm waters by means of proper control works, the present location of the water intakes with suitable water purification works for the water supply, would the public health conditions in the city of Chicago with special reference to the public water supply, in your opinion, be safeguarded as well as under present conditions"?

On re-reference the feasibility of constructing and using control works for the purpose of so discharging the storm overflow to the DesPlaines River, was further explained by complainants' witnesses (Joint Abst., 111, 208, 217, 229, 230).

Point II.

THE SUPREME COURT OPINION OF JANUARY 14, 1929, DOES NOT CONTEMPLATE PREVENTING DISCHARGE OF SEWAGE EFFLUENT, WASTE, STORM WATER AND RAIN WATER RUNOFF TO THE DES PLAINES RIVER, NOR DOES IT INTEND THAT DIVERSION FROM THE LAKE SHOULD CEASE.

The Supreme Court understood that the only question involved was as to the amount of water that should be "directly abstracted from Lake Michigan." In speaking of the history of the diversion, the Court said (Appendix, p. 5):

> "Meantime, all the sewage in the drainage district, including Evanston, was turned into the main channel, and the water *directly abstracted from Lake Michigan* by the Sanitary District was increased from 2,541 cubic feet a second in 1900 to 5,751 in 1909, to 7,228 in 1916, to 6,888 cubic feet a second in 1926, not including pumpage."

For the facts stated, the Court evidently referred to the table set forth in the Master's Original Report (pp. 22-23).

When the Supreme Court stated the issue in the case, it likewise had reference to the 8,500 cubic feet per second diversion from the Lake as authorized by the permit of March 3, 1925, for that was the permit the complainants sought to have declared invalid, together with the amount of diversion authorized by it. The Court said (Appendix, p. 19):

> "The exact issue is whether the State of Illinois and the Sanitary District of Chicago by *diverting* 8,500 *cubic feet per second from the waters of Lake Michigan* have so injured the riparian and other rights of the complainant States bordering the Great Lakes and connecting streams by lowering their levels as to justify an injunction to stop this diversion and thus restore the normal levels."

The opinion of the Supreme Court further stated (Appendix, p. 11):

> "The diversion of 8,500 cubic feet a second is now maintained under a permit of the Secretary of War of March 3, 1925, acting under Section 10 of the Act of 1899, which it is contended by the complainants vests no such authority in him."

The diversion there referred to, as it is referred to all through the opinion, is *the abstraction of water directly from Lake Michigan,* and it does not include sewage.

The Master's Original Report herein (November 23, 1927) states (p. 81):

> "The amount mentioned in the permit is exclusive of the domestic pumpage in Chicago, which in 1924 amounted to 1,274 c.f.s., in 1925 to 1,338 c.f.s., and in 1926 to 1,395 c.f.s."

The Supreme Court stated the complainants' claim as follows: (Appendix, p. 11):

> "They claim that the diversion is based on a purpose not to regulate navigation of the Lake, but *merely to get rid of the sewage of Chicago,* that this is a State purpose, not a Federal function, and should be enjoined to save the rights of complainants."

In other words, the Court did not understand that complainants in any manner contested the right of the City of Chicago to take from Lake Michigan the domestic water supply and to discharge the sewage into the DesPlaines River by means of the Drainage Canal.

That the Court did not contemplate complete cessation of the diversion or abstraction of water directly from Lake Michigan is apparent from the following quotation from the opinion (Appendix, p. 17):

> "In these circumstances we think they are entitled to a decree which will be effective in bringing that violation and the *unwarranted part* of the diversion to an end."

(Appendix, p. 19) "It therefore is the duty of this Court by appropriate decree *to compel the reduction* of the diversion to a point where it rests on a legal basis * * *."

Point III.

THE CITY OF CHICAGO HAS THE RIGHT TO TAKE WATER FROM LAKE MICHIGAN FOR ITS DOMESTIC PURPOSES AND DISCHARGE THE DRAINAGE, SEWAGE OR EFFLUENT OR WASTES FROM SEWAGE PURIFICATION WORKS WHEREVER IN ITS JUDGMENT IT MAY SEEM MOST APPROPRIATE.

(a) THE SUPREME COURT IN ORIGINAL SUITS BETWEEN STATES, ADOPTS THE LAW OF THE COMPLAINANTS AND DEFENDANTS AS ANNOUNCED BY THE CONSTITUTION, STATUTE OR THE OPINIONS OF THEIR COURTS.

Kansas v. *Colorado*, 206 U. S. 46.

Wyoming v. *Colorado*, 259 U. S. 419:

"(458) Turning to the decisions of the courts of last resort in the two States, we learn that the same doctrine respecting the division and use of the waters of natural streams has prevailed in both from the beginning and that each State attributes much of her development and prosperity to the practical operation of this doctrine.

* * * * *

(466) Diversions from one watershed to another are commonly made in both States and the practice is recognized by the decisions of their courts.

* * * * *

(467) The principle of such diversions being recognized in both States, its application to this interstate stream does not in itself afford a ground for complaint, unless the practice in both be rejected in determining what, as between them, is reasonable and admissible as to this stream, which we think should not be done.

* * * * *

(467) The lands in both States are naturally arid and the *need for irrigation is the same* in one as in the other.

(468) In neither State was the right to appropriate water from this interstate stream denied. On the contrary, it was permitted and recognized in both. The rule was the same on both sides of the line. Some of the appropriations were made as much as fifty years ago and many as much as twenty-five. In the circumstances we have stated, why should not appropriations from this stream be respected, as between the two States, according to their several priorities, as would be done if the stream lay wholly within either State"?

(b) THE LAW OF THE COMPLAINANT AND DEFENDANT STATES IS THAT A CITY LOCATED UPON A PUBLIC NAVIGABLE WATERWAY HAS THE RIGHT TO TAKE WATER FOR ITS DOMESTIC PURPOSES AND APPROPRIATE IT FOR ALL THE USES TO WHICH THE CITY MAY PUT IT, SUCH AS DRINKING, COOKING, SANITARY, MANUFACTURING, FIRE DEPARTMENT AND SUCH LIKE, EITHER AS RIPARIAN OWNER OR BY VIRTUE OF A GRANT BY THE STATE OF SUCH USE OF PUBLIC WATERS, AND NO LOWER OR OTHER RIPARIAN OWNER CAN COMPLAIN OF SUCH USE FOR DOMESTIC PURPOSES.

It has always been recognized that the riparian owner has the right to use such of the waters of a stream or lake as may be required for his domestic purposes. No lower riparian owner can complain. A city is recognized by some of the complainant States to be in the same position as a riparian owner of property with reference to the stream or lake upon which it is located. In the remainder of the complainant States it is recognized that a city has the right to take such waters as may be necessary for its domestic purposes from the public waters of the state. The water thus taken for domestic purposes is used by or digested by the city. It is consumed by the

people in drinking, cooking, in washing and bathing, by the fire department and by manufacturers, as well as others. This water is consumed just like other materials, such as food, soap and various other things. Waste is discharged from the city in the form of sewage. The water taken through the city's mains and thus consumed is not emptied from the sewers as water. It is something else, namely, sewage. Various chemical transformations have taken place. Further chemical processes go on as the sewage is passed through treatment plants such as have been described by the various sanitary witnesses. From the treatment plants there comes heavy material called sludge which is sometimes disposed of upon land. It is sometimes dried and a fertilizer is produced. Complainants certainly do not ask that we place this sludge in Lake Michigan. There is another material coming from these treatment plants called the effluent. It is a liquid and in its chemical constituents it is very materially different from water. It may have to some extent the appearance of water. It is not water. It is another substance,—sewage. Complainants' witness Ellms described the chemical constituents of sewage and the various chemical processes that go on in the sewers (Joint Abst., 234, 235).

Under an act of the General Assembly of the State of Illinois, entitled, "An Act to provide for the incorporation of cities and villages," approved April 10, 1872, in force July 1, 1872 (Hurd's Revised Statutes of Illinois, Chapter 24), the City of Chicago is empowered to do all acts and make all regulations which may be necessary or expedient for the promotion of health or the suppression of diseases, to establish and maintain a waterworks system for the purpose of furnishing residents and inhabitants of the city with water for the various uses of such inhabitants, such as drinking, cooking, bathing,

washing, manufacturing, prevention and extinguishment of fire and other uses to which water is ordinarily put by the residents and inhabitants of a city.

The Act further provides that the city shall have jurisdiction over all waters within or bordering on the same, to the extent of three miles beyond the limits of the city or village, but not to exceed the limits of the state, and that it may prevent or punish any pollution or injury to the stream or source of water or to such water-courses, its jurisdiction for such purposes extending five miles beyond its corporate limits, or so far as its waterworks may extend.

This Act empowered the City of Chicago to take from Lake Michigan, the only available water supply for Chicago, as the record shows, the water required for its domestic purposes.

The cases which we will now cite clearly show that it is the law of all complainants as well as of the defendant that a city may either as riparian owner or in the exercise of the State's police power delegated to it, take water from a public stream or lake upon which it is located for domestic purposes and discharge its sewage wherever reasonably appropriate without rendering compensation to riparian owners and against their complaint.

(1) *Ohio.*

City of Canton v. *Shock*, 66 Ohio 19.

Suit was instituted by Shock against the City of Canton to recover damages for the taking by the City of Canton of water for domestic purposes of the city from Nimishiller Creek, depleting, as the plaintiffs claim, the water for his grist mill located below the point where the water was appropriated by the City. The court said:

"(28) While the inhabitants own their lots indi-

vidually, the city owns the streets, the fire department and all other public property and public works, and in its corporate capacity, provides for the convenience and welfare of its inhabitants, as to streets, fire, protection, lighting and supplying water, and in such, and other like matters, the city overshadows the individuals, and stands in its corporate capacity as a single proprietor extending throughout its entire limits, and entitled as such to all the rights and subject to all the liabilities of a riparian proprietor on the stream upon which it is situated. Sound reason, the weight of authority, and the present advanced state of municipal government, rights and liabilities, require that a municipality should be held and regarded, in its entirety, as an individual entity, having in its corporate capacity the rights, and subject to the liabilities, of a riparian proprietor, and we so hold in this case.

* * * * *

(31) From the earliest dawn of history to the present time, the primary use of water has been for domestic purposes, and its secondary use for the purposes of power. People on the upper stream have the right to quench their thirst, and the thirst of their flocks and herds, even though by so doing the wheels of every mill on the lower stream should stand still. *Pennsylvania R. Co.* v. *Miller,* 112 Pa. 34, 41, 3 Atl. 780. And the same right in the use of water as to quenching thirst, extends to all uses for domestic purposes; and the rights of a lower proprietor to the use of the waters of a stream for power purposes, is subject to the superior right of all upper proprietors for domestic purposes, and must yield thereto. All water powers on a stream are established subject to the superior right of all upper proprietors to use water out of the stream for domestic purposes, and, if the upper proprietors have grown so large, or become so numerous as to consume most, or all of the water, the lower proprietors have no cause of complaint, because it is only what they should have reasonably expected in the growth and development of the country, and subject to which contingency they established their water powers.

* * * * *

(33) but for the water consumed by the city for its own purposes, or so supplied to its inhabitants for domestic use, even though it received pay therefor, it is not liable."

(2) *Minnesota.*

Minneapolis Mill Co, v. Board of Water Com'rs. of City of St. Paul, 56 Minn. 485:

"(488) Plaintiffs are corporations created in 1856 by acts of the Territorial Legislature, and authorized to build and maintain dams in the Mississippi river at the falls of St. Anthony, about ten miles above St. Paul, for the development of a water power, and for the use and sale of such power. One of these corporations, owning the shore on the east side of the river, erected a dam to the proper point in the river channel, and the other, owning the west shore, built its dam so as to connect the two, thus forming a power which has ever since been maintained and used.

In 1883 the Legislature authorized the city of St. Paul to purchase, and there was purchased, the property and franchises of a private corporation theretofore engaged in supplying said city with water. A board of water commissioners was created by the same act, and that board, a branch of the city government, is the present defendant. By the provisions of an amendatory act (Sp. Laws 1885, ch. 110, sec. 5 *et seq.*) the board was authorized and empowered to add to its sources of supply, and to draw water from any lake or creek, and, in general, to do any act necessary in order to furnish an adequate supply of water for the use of the city.

* * * * *

1. The plaintiffs are riparian owners on a navigable or public stream, and their rights as such owners are subordinate to public uses of the water in the stream. And their rights under their charters are, equally with their rights as riparian owners, subordinate to these public uses.

2. There can be no doubt but that the public, through their representatives, have the right to ap-

ply these waters to such public uses without providing for or making compensation to riparian owners.

3. The navigation of the stream is not the only public use to which these public waters may be thus applied. The right to draw from them a supply of water for the ordinary use of cities in their vicinity is such a public use, and has always been so recognized. At the present time it is one of the most important public rights, and is daily growing in importance as population increases. The fact that the cities, through boards of commissioners or officers whose functions are to manage this branch of the municipal government, charge consumers for water used by them, as a means for paying the cost and expenses of maintaining and operating the plant, or that such consumers use the water for their domestic and such other purposes as water is ordinarily furnished by city waterworks, does not affect the real character of the use, or deprive it of its public nature.

4. In thus taking water from navigable streams or lakes for such ordinary public uses, the power of the state is not limited or controlled by the rules which obtain between riparian owners as to the diversion from, and its return to, its natural channels. Once conceding that the taking is for a public use, and the above proposition naturally follows."

Lamprey v. *State of Minnesota,* 52 Minn. 181.

(3) *Michigan.*

Loranger v. *City of Flint,* 185 Mich. 454:

The plaintiff is a mill owner suing to enjoin the city from diverting water for domestic purposes from the Flint River.

"(459) The one nearest in point is the case of *Stock* v. *City of Hillsdale, supra.* The distinctions to be noted between the facts in this case and the one at bar are that Bawbeese Lake, the body of water from which the city of Hillsdale drew its supply, was in a sense private in character, and, in any event, lacked the qualities which are necessarily characteristic of a public navigable river. Again,

the city of Hillsdale is not located upon the banks of said lake, whereas the Flint river runs directly through the center of the city of Flint. At this point, and while considering the law as settled by this case, it is well to remark that, if the complainant is entitled to recover at all, the decree entered is wrong in two notable respects: First, under the circumstances of the case, she is not entitled to an injunction; and, second, she is not entitled to recover from the defendant for the value of water taken by it in excess of the prescriptive quantity, except at such times as such excessive use actually causes damage to her. We are of opinion that complainant's right to recover must be wholly denied upon broader grounds.

* * * * *

(4) The rule announced as to small private streams (*Hall* v. *City of Ionia, supra*), or as to small inland lakes (*Stock* v. *City of Hillsdale, supra*), has no application to the case at bar, which involves a public navigable river passing through the heart of defendant city."

(4) *Pennsylvania.*

Appeal of Frank Haupt, et al., 125 Pa. St. 211:

"The law was well stated by Justice Thompson in *Philadelphia* v. *Collins*, 68 Pa. 116, as follows:

'Every individual residing upon the banks of a stream has a right to the use of the water to drink and for the ordinary uses of domestic life; and where large bodies of people live upon the banks of a stream, as they do in large cities, the collective body of the citizens has the same right, but, of course, in a greatly exaggerated degree.'

And it was said by Chief Justice Gibson, in *Philadelphia* v. *Spring Garden*, 7 Pa. 363: 'The inhabitants of the district might have lawfully dipped from the margin of the pool water enough for their several necessities; but instead of drawing it by hand they have combined their funds to produce a cheaper and better transportation,' etc.

In each of these instances the learned Justice was speaking of a stream of water which is a public highway. To some extent the same principle may

be applied to what may be called a private stream. In the case of a river or public highway, all the people of a State have access to it, may ride over it and use the water. Not so with a private stream. In such case, no one can use it or take the water except at a public crossing. There the traveler may stop, refresh himself and water his horse; the water has no owner, and he impairs no man's right. But except at public crossings, such as a road or a street, no one but a riparian owner can use the water, not because the latter has any ownership in it, but because the stranger has no right of access to it. There can be no such thing as ownership in flowing water; the riparian owner may use it as it flows; he may dip it up and become the owner by confining it in barrels or tanks, but so long as it flows it is as free to all as the light and the air.

It follows from what has been said that dwellers in towns and villages watered by a stream may use the water as well as the riparian owner, provided they have access to the stream by means of a public highway."

In the case of *City of Philadelphia* v. *Collins,* 68 Pa. 106, at page 123, it is said:

"It was conceded on the trial, that upon taking water for the citizens of the city for domestic purposes, no restriction could be placed by legislation or grant, and none was placed. If it could have been shown that it was this supply for domestic purposes only which occasioned the insufficiency for navigation, then the law of a paramount necessity would have existed, and have brought into play the doctrine of riparian rights, and justified the taking."

City of Philadelphia v. *Comm'rs of Spring Garden,* 7 Pa. 348.

Filbert v. *Dechert,* 22 Pa. Sup. Court 362.

Palmer Water Co. v. *Lehighton Water S. Co.,* 280 Pa. St. 492, 499.

Boalsburg Water Company v. *State College Water Co.,* 240 Pa. State 198.

Scranton Gas & Water Company v. *D. L. & W. R. R. Co.,* 240 Pa. State 604.

(5) *New York.*

Daniel Crill, agt. The City of Rome, 47 Howard's Practice Reports, 398:

"The plaintiff, having a mill privilege in the city of Rome, supplied by water taken by means of a dam and an artificial channel from the Mohawk river, brings this action to restrain the defendant, the city of Rome, from taking the waters of the Mohawk river at a point called the Ridge, for the purpose of supplying the defendant's 'water-works' with pure and wholesome water.

The city was expressly authorized to construct 'water-works,' and to supply the city with water, by an act of the legislature, passed April 24, 1872, chapter 352, Laws of 1872.

* * * * *

Several cases have arisen in respect to the waters of the Mohawk river, and very much discussion has been had on them in respect to the applicability of the common law of England in respect to navigable streams, and it has been very distinctly held and settled that (1) 'The Mohawk river is a navigable stream, and the title to the bed of the river is in the people of the state. (2) Riparian owners along the stream are not entitled to damages for any diversion or use of the waters of the Mohawk by the state' (*The People ex rel. Loomis agt. The Canal Appraisers,* 33 New York 461).

Such is the doctrine established by the court of last resort in this state, and the same is not open for cavil or discussion in this court.

* * * * *

It is difficult to see any good reason why the people, if regarded as having the sole right to the use of the waters of a river, and authorized to divert them for purposes of artificial navigation, or to lease them to individuals, may not be equally possessed of the power to authorize them to be taken and applied for the 'public use' contemplated by the act authorizing the defendant to construct its water-works and use the waters for supplying its inhabitants with pure and wholesome water."

The ownership, dominion and sovereignty of the State of Illinois in the lands covered by the waters of Lake Michigan within the State's boundaries and in the waters of the Lake are the same as the ownership, dominion and sovereignty of New York with reference to the lands and waters of the Mohawk and Hudson (*Ill. Central R. R.* v. *Illinois*, 146 U. S. 387, 435).

Strobel v. *Kerr Salt Co.*, 164 N. Y. 303, 320.

United P. B. Co. v. *Iroquois P. & P. Co.*, 226 N. Y. 38, 45.

(6) *Wisconsin.*

In Wisconsin the riparian rights doctrine of the other states is recognized.

Haseltine v. *Case*, 46 Wis. 391.

Riparian owners on navigable streams in Wisconsin own to the center of the stream, but their rights are subject to the superior rights of the public as to navigation, fishing, hunting, etc.

State v. *Sutherland*, 166 Wis. 511.

Metropolitan Investment Co. v. *Milwaukee*, 165 Wis. 216.

Thomas Furnace Co. v. *Milwaukee*, 156 Wis. 549.

Wisconsin River Improvement Co. v. *Lyons*, 30 Wis. 61.

Diana Shooting Club v. *Husting*, 156 Wis. 261.

The City Charter of Milwaukee (Chapter 184 of the Laws of 1874 of Wisconsin, Section 10), provides in substance that it shall be the duty of the Commissioner of Public Works to examine and consider all matters relative to supplying the City of Milwaukee with a sufficient quantity of pure, wholesome water to be taken from Lake

Michigan for the use of its inhabitants. Section 22 of the Charter of Milwaukee empowers the city to furnish water to parties outside the city, and the Commissioner of Public Works, subject to the approval of the Common Council of the City, may issue permits to the County of Milwaukee, National Home for Disabled Soldiers, or any other party to obtain water from the waterworks in the said city for the use outside of the limits of said city. Thus it is apparent that not only do the Wisconsin Acts as to Milwaukee empower the city to take and use water from Lake Michigan for its own domestic purposes, but also to furnish water to various persons and institutions outside the limits of Milwaukee.

ALL OF THE COMPLAINANT STATES, RECOGNIZING THE NECESSITY OF PREVENTING THE POLLUTION OF WATER SUPPLIES BY THE DISCHARGE OF SEWAGE INTO THEM, HAVE ENACTED LAWS FOR THE PREVENTION OF SUCH DISCHARGE THROUGH A BOARD OR DEPARTMENT HAVING JURISDICTION THEREOF, OR BY PROVISIONS FOR DIRECT ACTION BY MUNICIPALITIES TO RESTRAIN AND ENJOIN SUCH DISCHARGE.

Chapter 46, Cahill's Consolidated Laws of New York, Public Health Law, Article 5, Sections 70-87 "Potable Waters";

Page's Annotated General Code, Ohio, State Department of Health, Public Water Supply 1249;

Cahill's Compiled Laws of Michigan, 1922, 783 (6); 7637 (1); 5034 (11);

Wisconsin Statutes of 1923, 144.01, 144.03;

Statutes of Pennsylvania 1920, 18,247-49;

Mason's Minnesota Statutes 1927, Pollution of Water, 5375.

(7) *Illinois.*

City of Elgin v. *Elgin Hydraulic Co.,* 85 Ill. App. 182:

> "We are therefore of opinion that the right of the public residing along Fox river to take water out of the same for domestic, sanitary and fire purposes, is paramount to the right of the owners of said water power to use the same for the purpose of propelling the machinery of their mills."

(c) *Law of other States is similar.*

Watuppa Reservoir Co. v. *City of Fall River,* 147 Mass. 548:

Plaintiff, a mill owner, on a stream flowing from a great pond, sought to enjoin the defendant city from taking water from the pond for domestic purposes under grant from the state. The court after holding that the State's rights in great ponds were the same as its rights where there was ebb and flow of the tide (which rights are the same that Illinois has in Lake Michigan), said:

> (557) "All who take and hold property liable to be affected by this rule of property, take and hold under and in subordination to it. Each grant carries with it an implied reservation of these paramount rights, unless the terms of the grant exclude such reservation. So that the grant, from the State, of land upon a stream flowing from a great pond did not convey an unqualified fee with the right to enjoy the usual and natural flow of the stream, but a qualified right, subject to the superior right of the State to use the pond and its waters for other public uses if the exigencies of the public, for whom it holds the pond in trust, demand it."

See

Illinois Central R. R. v. *Illinois,* 146 U. S. 387, 435.

Fisk v. *Hartford*, 69 Conn. 375:

The plaintiffs were the owners of a valuable mill property on the Park River in the City of Hartford. Defendant was the owner of a large system of reservoirs for the use of Hartford for domestic and other purposes. The sewage drained into Park River above plaintiff's dams. The city shortly prior to the institution of the suit, became engaged in constructing an intercepting sewer to divert the sewage and surface water away from its original flow in the Park River, to the Connecticut River, thus depriving the plaintiff's mill of a large portion of the sewage and drainage which would have flowed into its reservoir on Park River if this sewer interceptor were not built.

The City Council of Hartford determined that the proper disposition of the sewage required its diversion from Park River. The relief prayed was an injunction against the defendant from diverting into the intercepting sewer the present current and flow of water in Park River, whether such flow of Park River be through drains, pipes, sewers, surface flowage or otherwise. It was shown that the building of the intercepting sewer was to remove "what is called Park River sewer nuisance."

The court observes (page 389):

> "The complaint is not brought to have the city enjoined from diverting the water of Park river or its tributaries into the reservoirs and distributing pipes of the city, or from using the water so diverted, but it is brought to restrain the city from diverting its sewage into the intercepting sewer; and this is the very gist of the complaint."

The court said (page 390):

> "Now, it is quite clear that the city either has, or it has not, the right, as against the plaintiffs, to take and use the water which constitutes its supply, • • •

and in either case, we think it is equally clear that the city has the right * * * to dispose of that water after it enters the sewerage system as sewage * * * as it sees fit. In other words, the plaintiffs may or may not have the right to have the whole or a part of the water supply of the city returned as water to Park river; but in either case they have no right to have it so returned after it has become sewage, or to have it returned through the sewerage system of the city * * * If the city has the right * * * to take and use the water in its reservoirs, then, clearly, it has the further right * * * either before or after it is used, to dispose of it under its charter as it sees fit. If, on the other hand, it has no right * * * to take or use the waters in its reservoirs, * * * this fact of itself does not give the plaintiffs a right to control the disposition of such water after it has entered the sewerage system, and become sewage. That control still remains with the city, and ought to remain with it. * * * In this view of the case, it makes no difference whether the sewage is or is not injurious to health, or whether its open flow has or has not otherwise become a nuisance. In either case the city still has, and ought to have, full control over it, and the pipes, drains and sewers through which it flows, or can be made to flow. If the city wrongfully takes and uses the plaintiff's water, the remedy for such a wrong is ample, either by an action at law for damages, or, in a proper case in equity, by injunction; but where, as in this case, the plaintiffs apparently condone the wrongful taking and using of the water, on condition that it shall be allowed to come back to them in the form of sewage through the city sewers, and assert a right to sewage as such, and to have it flow through the sewers as it has been accustomed to flow, they cannot have the remedy which they now seek, simply because they have not shown that they possess any such right. The complaint clearly shows that it is the sewage of the city, and not the waters of Park river or its tributaries in any proper sense, which the city is about to turn into the intercepting sewer: and it is this precise diversion, and nothing else, which the plaintiffs seek to have en-

joined. For the reasons given, we are of opinion that they are not entitled to the injunction."

City of Auburn v. *Union Water Power Co.*, 90 Me. 576.

Barre Water Co. v. *Carnes*, 65 Vt. 626.

(d) DIVERSIONS OF WATER FROM ONE WATERSHED TO ANOTHER HAVE BEEN THE COMMON PRACTICE OF COMPLAINANT STATES.

The feeders of the Erie Canal were installed without regard to watersheds, with the effect of diverting from one drainage area to another. To some extent this practice has continued on the New York State Barge Canal. The waters of Oil Creek, a tributary of the Allegheny River and of the Mississippi, are diverted into the Genesee River and thence to the Erie Canal. Diversions for the Erie Canal took place from the waters of the Ontario Basin into the Mohawk-Hudson Basin. Feeders of the Rome Summit level diverted water from the Susquehanna River into Lake Ontario. At Glen Falls water is diverted from the Hudson River system into the St. Lawrence. In the State of Wisconsin water is diverted from the Wisconsin (a feeder of the Mississippi) into the Fox (a tributary of the Great Lakes (Defendants' Ex. 1203, p. 71).

In Ohio, the Ohio and Erie Canal diverted water from a tributary of the Mississippi into Lake Erie (Ex. 1203, p. 71).

The State of New York has by act of its legislature conferred upon the City of New York power and authority to take from the head waters of the Delaware River a large volume of water for the city's domestic water supply. This water is to be diverted and taken from one watershed to another and will go into the City of New

York's system. It will become sewage along with other materials and will be discharged ultimately into the Ocean. There is no provision by this act for the discharge by pumping or otherwise of a quantity of sewage or a quantity of effluent from sewage purification works to the Delaware River or the head waters of the Delaware River equal to the quantity of water to be taken for domestic purposes. (See page 12, bill of complaint, *State of New Jersey* v. *State of New York and City of New York*, and page 8 of the answer of the City of New York, filed May 27, 1929, No. 20 Original, October Term, 1928).

Section 18,769 of West's Statutes of Pennsylvania, entitled "Railroads and Canals," provides with reference to the construction and operation of the Lake Erie and Ohio River Canal as follows:

> "The Commonwealth of Pennsylvania shall locate, construct, maintain and operate a navigable interstate canal or waterway, having a depth of not less than nine feet, from the junction of the Ohio and Beaver rivers, in the State of Pennsylvania; thence, by way of the Beaver and Mahoning rivers, in the State of Pennsylvania, and the Mahoning river, in the State of Ohio, to a point in Trumbull County, either at or near Niles, Ohio, or a short distance west of Warren, Ohio; thence, northwardly, through the State of Ohio, to a terminal on Lake Erie, at or near the mouth of Indian Creek, in the State of Ohio; together with all such branch canals, locks, dams, tunnels, aqueducts; feeders to supply water from any lakes, rivers, streams or water courses; docks, harbors; reservoirs for the supply of water for the canal or its feeders, or for the regulation of streamflow";

The legislature of Ohio authorized the building of this Canal through the territory of the state (Page's Annotated Statutes of Ohio, Tit. II, Chap. 8, Sec. 13996-1).

Diversions for navigation and power purposes have

been made in the Great Lakes system at many places such as St. Mary's River, Welland Canal, New York State Barge Canal and Niagara Falls. All these diversions have had an effect upon navigation and other interests of the complainants similar to the claimed effect of the diversion at Chicago. These diversions have been acquiesced in and were undoubtedly made for the purpose of taking advantage of the natural resources of the states making the diversion.

Wyoming v. *Colorado,* 259 U. S. 419.

The Court said (466):

> "The objection of Wyoming to the proposed diversion on the ground that it is to another watershed, from which she can receive no benefit, is also untenable. * * * The principle of such diversions being recognized in both states, its application to this interstate stream does not, in itself, afford a ground for complaint, unless the practice in both be rejected in determining what as between them, is reasonable and admissible as to this stream, which we think should not be done."

THE ACTS OF CONGRESS OF 1822 AND 1827, AND THE ACTS OF ILLINOIS, HAVE BROUGHT CHICAGO WITHIN THE WATER-SHED OF THE MISSISSIPPI RIVER AT LEAST FOR THE PURPOSE OF DISCHARGING THE RUN-OFF OF THE CHICAGO RIVER DRAINAGE AREA AND SEWAGE.

Missouri v. *Illinois,* 200 U. S. 496:

> "(526) Some stress was laid on the proposition that Chicago is not on the natural watershed of the Mississippi, because of a rise of a few feet between the Desplaines and the Chicago Rivers. We perceive no reason for distinction on this ground. The natural features relied upon are of the smallest. And if under any circumstances they could affect the case, it is enough to say that Illinois brought Chicago into the Mississippi watershed in pursuance not only of its own statutes, but also of the Acts of Con-

gress of March 30, 1822, c. 14, 3 Stat. at L. 659, and March 2, 1827, c. 51, 4 Stat. at L. 234, the validity of which is not disputed. *Wisconsin* v. *Duluth*, 96 U. S. 379. Of course these acts do not grant the right to discharge sewage, but the case stands no differently in point of law from a suit because of the discharge from Peoria into the Illinois, or from any other or all the other cities on the banks of that stream."

(e) SINCE ABOUT 1865, THERE HAS BEEN DISCHARGED TO THE DES PLAINES RIVER BY WAY OF THE ILLINOIS AND MICHIGAN CANAL OR THE SANITARY AND SHIP CANAL, AND FROM THE CHICAGO RIVER, AN AMOUNT OF SEWAGE AND WATER EQUAL TO THE AVERAGE RAIN WATER RUN-OFF OF THE CHICAGO RIVER DRAINAGE AREA AND THE SEWAGE AND WASTES (CHICAGO'S PUMPAGE).

See *Supra*, 35, 36.

IV.

AFTER THE WORKS RECOMMENDED IN THE SPECIAL MASTER'S REPORT FOR THE TREATMENT OF SEWAGE AND WASTES HAVE BEEN INSTALLED, THEN THERE WILL HAVE BEEN DISPOSED OF AND ELIMINATED ALL THE SEWAGE AND WASTES THAT MAY BE SO ELIMINATED AND DISPOSED OF FROM A PRACTICABLE STANDPOINT. THERE WILL BE LEFT A RESIDUE OF WASTES IN THE EFFLUENTS AND IN STORM WATER AFTER SUCH WORKS ARE PUT IN OPERATION. THEREFORE, A REASONABLE AMOUNT OF WATER WILL BE REQUIRED AND MAY BE DIVERTED FROM LAKE MICHIGAN TO APPROPRIATELY PREVENT NUISANCE TO OR INTERFERENCE WITH NAVIGATION OR NAVIGABLE WATERS IN THE PORT AND HARBOR OF CHICAGO AND IN LAKE MICHIGAN, TO PREVENT POLLUTION AND IMPAIRMENT OF THE DOMESTIC WATER SUPPLY, AND BATHING BEACHES AND TO PREVENT OTHER NUISANCES.

The Master found that

"If the flow at Lockport were entirely stopped, the result would be, as Colonel Townsend, testifying

for the complainants, said, 'that the only water from the Lake would be that which comes in as the Lake rises and falls.' In that case, with the water held at Lockport, there would be 'absolutely no slope in the river and its connections.' The large sewage treatment works—the West Side and the Southwest Side plants—adjoining the Drainage Canal will pour their effluents into the canal, and if there is no flow at Lockport, these effluents will pass directly into the Chicago River. It is found that one hundred per cent purification of the sewage taken to the treatment works is not practicable with present knowledge. * * * This means that an amount not exactly determinable, which may be less than ten per cent or possibly as high as fifteen per cent, of the sewage will not have been purified and will be represented in the effluent. * * * While the residual organic matter in the effluent may be very different from an equal percentage of the raw sewage as a potential source of nuisance, it is far from demonstrated, in my judgment, that with all flow stopped at Lockport, the concentration of such a vast volume of effluent as will flow from the proposed sewage plants, together with the untreated sewage and wastes carried with the storm flow into the limited channels of the Drainage Canal and Chicago River will not create conditions in these channels seriously detrimental to navigation." (Master's Report, pp. 136-137).

In referring to the request of the complainants that the defendants be enjoined from discharging sewage into the Chicago River in such manner as to create an obstruction to or interference with navigation or navigable capacity, the Master stated (Master's Report, p. 137):

> "It seems to me that the best way, and the reasonably sure way, of accomplishing this result is to permit an outflow from the Drainage Canal at Lockport."

In referring to the complainants' suggestion that outfall sewers or tunnels be built to carry the effluents directly to the Lake, or that circulating water be pumped

from the Lake through the channels of the Chicago River, the Master stated:

> "It is not clear that this course would be compatible with the interests of navigation in the Chicago harbor, and that there would be a serious danger of contaminating the water supply and of creating offensive conditions at the bathing beaches of the city is quite evident." (Master's Report, p. 138)

Concerning complainants' suggestion that the water supply be filtered, the Master stated:

> "The fact remains that the effluents from the sewage treatment plants and the storm water must go somewhere, and if they are taken away from the Lake and discharged through the canal at Lockport, both the danger to the water supply will be removed and conditions suitable to navigation can be maintained.
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> My conclusion is that so far as the question can be determined at this time, the interests of navigation in the Chicago River as a part of the Port of Chicago, when the above described sewage treatment program has been carried out, will require that the flow of the Drainage Canal be discharged at Lockport, and that for this purpose there will be necessary a diversion of water from Lake Michigan
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> This disposition is believed to be in accord with the equitable principles which appropriately govern the exercise of the jurisdiction to determine controversies between States, a jurisdiction which is unfettered by technicalities and in the last analysis is for the purpose of establishing substantial justice. In the present instance, equitable considerations are those applicable with appropriate regard to the substantial rights of the complainants, as determined by this Court, after the Sanitary District has carried out the above described comprehensive program for sewage treatment." (Master's Report, pp. 138-139)

(a) THE COURT IN EXERCISING ITS JURISDICTION IN CONTROVERSIES BETWEEN STATES, WILL APPLY THE PRINCIPLE OF COMITY AND EQUALITY OF RIGHT AND OPPORTUNITY AND SUCH EQUITABLE PRINCIPLES AS WILL EFFECT A JUST AND EQUITABLE SOLUTION OF THE PROBLEM UNDER ALL THE CIRCUMSTANCES OF THE CASE.

Equality of right does not mean an equal division of water. The states stand on an equal level or plane. Each state has the right to take advantage of what nature has by reason of its topography, natural resources and other advantages provided it, even though in putting such resources to the best available use or uses, such state may encroach to some extent upon the solitary rights or the equally full enjoyment of rights of some other state or states. Each state has an equal right not only to utilize the natural advantages within its borders but has an equal right to use those great natural assets which are available to many states in common. And in appropriating part of such natural advantages which are available to other states, the right of one state is not to be limited by technical or narrow rules. Thus generally the public welfare of the people of all the states will be advanced.

The Great Lakes system of waters and waterways furnish great and vast opportunities to the communities and peoples living in that region. It is only necessary to call to mind the various uses to which those waters have been put to illustrate the principle for which we are contending. There is no body of fresh water in the world that can compare with them. In their natural state the waters are pure and available for drinking and other domestic uses and are consumed when so used. They are used for navigation and the development of power. The outflow of Lake Superior is controlled so that Lake

Superior levels are changed from their natural condition and are being artificially regulated. This regulation affects the levels of the lower lakes, oftentimes adversely, making the levels of those lakes much lower than they would be but for the control of the outflow of Superior. The deepening of the channels of the St. Clair and Detroit Rivers has increased the outflow of Lakes Michigan and Huron, thus permanently reducing their levels. At the same time it has permanently increased the levels of Lakes Erie and Ontario.

The utilization of the power at Niagara Falls has likewise affected the natural level of Lake Erie, materially reducing the levels of that Lake and to some extent affecting the levels of Huron and Michigan. The diversion, through the Welland Canal and by way of the New York Barge Canal for navigation and power purposes, has had similar effects.

The building of the Gut Dam in the Galops Rapids of the St. Lawrence in 1903 for navigation purposes has permanently raised the elevation of Ontario about 5 inches. These are some of the illustrations by which the natural conditions have been changed in order to permit a greater enjoyment of the resources present in this great natural asset, the Great Lakes. Of course some states have been benefited more than others by these changes from natural conditions. The benefit obtained by one state has resulted in a corresponding injury to other states. This process necessarily demonstrates that there must be an accommodation of mutual rights in order that the greatest benefit for all may be produced.

The discharge of the effluent and storm water, together with a reasonable amount of water direct from Lake Michigan to the DesPlaines River, constitutes the natural and logical method of disposing of these wastes and protecting navigation. In that way, Lake Michigan,

navigable water of the United States, so long kept free from the sewage and waste pollution of the great and vast population of Chicago and vicinity, will continue in the same way to be free of such pollution. Thereby navigation upon Lake Michigan will not be affected materially, no nuisance will result to the numerous bathing beaches along Chicago's Lake front, so necessary for the people and furnishing to many thousands of people every summer much needed recreational facilities. The United States Governmental Naval Training Station and Coast Guard Stations will not be affected. Recreational boating so extensive at Chicago will be permitted to go on free and unimpeded by nuisance from such wastes (Evers, Joint Abst., 262-265).

As to extended use of bathing beaches, see Defts. Exs. 1435-1440. (Joint Abst., 327-333).

On the other hand, the discharge of the effluent and storm water to the DesPlaines and Illinois Rivers will not tend to change the condition of those rivers from what they are now, but to better them. Waters of those rivers have never been used as a water supply by any community. The extent of their use for bathing and recreational purposes is and will be negligible in comparison with such use of Lake Michigan waters at Chicago.

As has been shown, the domestic pumpage or water taken for domestic purposes cannot be complained of, and the complainant states as lower riparian owners, together with their people and citizens, enjoy the Great Lakes subject to this right of Chicago to take from the Lakes and use and consume necessary water for domestic purposes. The ordinary rain water runoff of the Calumet and Chicago River drainage areas must necessarily become mixed with and a part of the sewage. In any event, this ordinary rain water runoff has been discharged

to the DesPlaines River substantially continuously since 1865. In this there has been such long acquiescence that there can be no possibility of complaint. The amount of water required from Lake Michigan to protect navigation is small, and the effect, if any, upon the interests of complainant states, is negligible in comparison with the great financial burden that would be placed upon the people of Chicago, (Pearse, Joint Abst., 521-525, Defts. Ex. 1310), and the inconveniences from nuisance to the people living at Chicago, as well as to the persons navigating the Lakes.

Kansas v. *Colorado*, 206 U. S. 46:

> "(100) We must consider the effect of what has been done upon the conditions in the respective States and so adjust the dispute upon the basis of equality of rights as to secure as far as possible to Colorado the benefits of irrigation without depriving Kansas of the like beneficial effects of a flowing stream.
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> But we are justified in looking at the question not narrowly and solely as to the amount of the flow in the channel of the Arkansas River, inquiring merely whether any portion thereof is appropriated by Colorado, but we may properly consider what, in case a portion of that flow is appropriated by Colorado, are the effects of such appropriation upon Kansas territory. For instance, if there be many thousands of acres in Colorado destitute of vegetation, which by the taking of water from the Arkansas River and in no other way can be made valuable as arable lands producing an abundance of vegetable growth, and this transformation of desert land has the effect, through percolation of water in the soil, or in any other way, of giving to Kansas territory, although not in the Arkansas Valley, a benefit, from water as great as that which would inure by keeping the flow of the Arkansas in its channel undiminished, then we may rightfully regard the usefulness to Colorado as justifying its action, although the locality of the

benefit from the flow of the Arkansas through Kansas has territorially changed.

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(102) May we not consider some appropriation by Colorado of the waters of the Arkansas to the irrigation and reclamation of its arid lands as a reasonable exercise of its sovereignty and as not unreasonably trespassing upon any rights of Kansas?

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(103) And in the opinion, on pages 242, 243, are quoted these observations of Chief Justice Shaw in the case of *Elliott* v. *Fitchburg Railroad Company,* 10 Cush. 191, 193, 196:

'The right to flowing water is now well settled to be a right incident to property in the land; it is a right *publici juris,* of such a character that whilst it is common and equal to all through whose land it runs, and no one can obstruct or divert it, yet, as one of the beneficial gifts of Providence, each proprietor has a right to a just and reasonable use of it, as it passes through his land; and so long as it is not wholly obstructed or diverted, or no larger appropriation of the water running through it is made than a just and reasonable use, it cannot be said to be wrongful or injurious to a proprietor lower down.

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(104) It is, therefore, only for an abstraction and deprivation of this common benefit or for an unreasonable and unauthorized use of it, that an action will lie.'

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(105) So that, if the extreme rule of the common law were enforced, Oklahoma having the same right to insist that there should be no diversion of the stream in Kansas for the purposes of irrigation that Kansas has in respect to Colorado, the result would be that the waters, except for the meagre amount required for domestic purposes, would flow through eastern Colorado and Kansas of comparatively little advantage to either State, and both would lose the

great benefit which comes from the use of the water for irrigation.

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(109) These tables disclose a very marked development in the population, area of land cultivated and amount of agricultural products. Whatever has been effective in bringing about this development is certainly entitled to recognition, and should not be wantonly or unnecessarily destroyed or interfered with.

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(113) It cannot be denied in view of all the testimony (for that which we have quoted is but a sample of much more bearing upon the question), that the diminution of the flow of water in the river by the irrigation of Colorado has worked some detriment to the southwestern part of Kansas, and yet when we compare the amount of this detriment with the great benefit which has obviously resulted to the counties in Colorado, it would seem that equality of right and equity between the two States forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation."

North Dakota v. *Minnesota,* 263 U. S. 365:

"(372) The jurisdiction and procedure of this Court in controversies between States of the Union differ from those which it pursues in suits between private parties. This grows out of the history of the creation of the power, in that it was conferred by the Constitution as a substitute for the diplomatic settlement of controversies between sovereigns and a possible resort to force."

Wyoming v. *Colorado,* 259 U. S. 419:

"(464) The decision in *Kansas* v. *Colorado,* 206 U. S. 46, was a pioneer in its field.

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In these circumstances, and after observing that the diminution in the flow of the river had resulted in 'perceptible injury' to portions of the valley in Kansas, but in 'little, if any, detriment' to the

great body of the valley, the court said, 'it would seem equality of right and equity between the two States forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation'; and that, if the depletion of the waters by Colorado should be increased, the time would come when Kansas might 'rightfully call for relief against the action of Colorado, its corporations and citizens in appropriating the waters of the Arkansas for irrigation purposes.' What was there said about 'equality of right' refers, as the opinion shows (p. 97), not to an equal division of the water, but to the equal level or plane on which all the States stand, in point of power and right, under our constitutional system."

Minnesota Rate Cases, 230 U. S. 352, 402:

"Our system of Government is a practical adjustment by which the national authority as conferred by the constitution is maintained in its full scope without unnecessary loss of local efficiency."

In *Kansas* v. *Colorado,* 185 U. S. 125, the court said:

"Sitting, as it were, as an international as well as a domestic tribunal, we apply federal law, state law and international law, as the exigencies of the particular case may demand."

In *Kansas* v. *Colorado,* 206 U. S. 46, the court quoted from the opinion in the *Paquette Habana,* 175 U. S. 677, 701, as follows:

"International law is part of our law, and must be ascertained and administered by the courts of justice of appropriate jurisdiction as often as questions of right depending upon it are duly presented for their determination."

In early times when the civilization and activities of the peoples of the world were primitive, then the great natural resources and advantages due to geographical locations were not required to be used to the greatest extent possible and few occasions arose for contact

between the different peoples. Likewise, early in the history of the United States similar conditions existed and the different states of the Union as sovereigns had few occasions for contact, and it was very infrequent when one state in the development of its natural resources would encroach upon the rights or activities of another state. Then the controversies between states were principally over boundaries. This court said in

Kansas v. *Colorado,* 206 U. S. 46, 80:

> "Controversies between the states are becoming frequent and in the rapidly changing conditions of life and business, are likely to become still more so. Involving, as they do, the rights of political communities which in many respects are sovereign and independent, they present not infrequently questions of far-reaching import and of exceeding difficulty."

The Supreme Court had then just decided the case of

Missouri v. *Illinois,* 200 U. S. 496,

wherein the court refused to grant the relief to Missouri even though there was recognized to be an invasion of the legal rights of Missouri by Illinois. But the court, believing that Illinois was conscientiously attempting to take advantage of a great opportunity to keep the water supply of the great commercial center of the United States rapidly growing in population, to become one of the great cities of the world, free from that city's sewage and wastes, upheld Illinois in her worthy endeavors.

In

Kansas v. *Colorado,* 206 U. S. 46,

the court went further and denied to Kansas the relief for invasion of legal rights where Colorado was seeking to use the waters of the Arkansas River for the purpose of irrigation and not for the purpose of protecting health

or preserving life. It stated then the principle of equality of right and opportunity between the states.

In

Wyoming v. *Colorado,* 259 U. S. 419, 464,

further applying that principle, the court restated it to be:

> "the equal level or plane on which all the States stand, in point of power and right, under our constitutional system."

This can only mean that each state in performing its duty to its people and the people of the United States in conjunction with its sister states, has the right to go forward and progress by availing itself of those natural opportunities which are before it because of its commercial location and by reason of the natural resources located within its boundaries. Such state will be permitted under international law or interstate law as it has been established by this court, to so progress and go forward, even though by such acts it may, perforce, require limitations in measuring the rights of other states.

In determining the principle or principles of international law applicable to any particular situation, precedents as established by treaties between different nations concerning similar situations, are of great weight. The recent Colorado River compact is excellent authority in support of the doctrine of equal right and opportunity between states, and becomes a persuasive precedent in applying interstate law principles in controversies between the states.

The definitive Treaty of Peace between the Colonies and Great Britain of 1783 provided that the people of the United States should continue to enjoy unmolested the right to fish in various waters along Newfoundland, the St. Lawrence, Nova Scotia, Magdalen Islands and

Labrador. For many years no difficulties arose over this right and liberty to fish while Canada and the United States remained comparatively small in population and in commercial activities. However, later for many years the right to fish and the Behring Sea seal catch became a source of constant controversy, negotiation and treaty between the United States, Great Britain, Japan and Russia. The settlement of these controversies by the different treaties and awards at various times always looked to the working out of a plan by which the aspirations of all parties concerned in the advancement of their public welfare were allowed to be realized.

The Treaty of Amity and Commerce of 1794 between the United States and Great Britain, among other things provided, (Article IV):

> "Whereas it is uncertain whether the River Mississippi extends so far to the northward as to be intersected by a line to be drawn due west from the Lake of the Woods in the manner mentioned in the Treaty of Peace between his Majesty and the United States, * * * if * * * it should appear that the said River would not be intersected by such a line as is above mentioned, the two parties will thereupon proceed by amicable negotiation to regulate the boundary line in that quarter, as well as all other points to be adjusted between the parties *according to justice and mutual convenience.* * * *"

(b) THE "NATURAL AND LOGICAL" PLACE FOR THE DISCHARGE OF THE EFFLUENT AND DRAINAGE OF THE SANITARY DISTRICT, INCLUDING THE UNTREATED SEWAGE IN STORM WATERS WITH A REASONABLE AMOUNT OF LAKE WATER TO AVOID NUISANCE AND IMPEDIMENT TO NAVIGATION, IS THE DESPLAINES RIVER.

The discharge of all effluent, storm water, untreated sewage in such storm waters, and drainage to Lake Michigan, as complainants propose, would cause injury to

recreational navigation such as boating, and other navigation, on the Lake front waters. Bathing beaches so extensively used at Chicago would be impaired and nuisance would result on the Lake front to navigators and others using the Lake waters. Flushing the Chicago River would not improve the condition of the Lake front waters. It would merely hurry the pollution to the Lake and more bacterial would reach the Lake, (Gascoigne, Joint Abst., 213; Townsend, Joint Abst., 223), endangering to a greater extent the water supply and creating a more dangerous menace to navigation on the Lake front and to bathing beaches than will exist if there is no flushing. Complainants, however, were put to the necessity of suggesting flushing in order to avoid the insuperable and obvious objection of nuisance that would obtain in the Chicago River, in its branches and in the canals of the Sanitary District and in the harbor and Lake if these wastes were discharged directly into the Lake. The building of tunnels from the different treatment plants to the Lake to carry their effluent, would merely transfer the point of intensity of pollution of the Lake front from the mouths of the Chicago and Calumet Rivers to the outlets of the different tunnels. The storm water with its untreated sewage would still be discharged to the Lake through the Chicago and Calumet Rivers, a very serious condition and admitted to be so by complainants, always present under complainants' program for the turning of Chicago's wastes into Lake Michigan (Master's Report, pp. 136-140).

THE DISCHARGE INTO LAKE MICHIGAN OF EFFLUENT FROM TREATMENT PLANTS, STORM WATER, UNTREATED SEWAGE THEREIN AND DRAINAGE, AS COMPLAINANTS PROPOSE, WOULD FOREVER IMPAIR CHICAGO'S ONLY WATER SUPPLY.

Complainants' witness Ellms stated (Joint Abst., 229):

> "Lake Michigan is the present water supply of Chicago. Assuming the completion of the program as outlined by the Sanitary District Engineers, assuming that the sewage effluent is discharged into the Lake at dry weather times, assuming the diversion of the storm water overflow and sewage effluent at times of storms, and assuming no water filtration works, the quality of the water would not be as good as it is now coming through the intakes for chlorination. In other words, the Lake Michigan water would be affected by the sewage effluent."

Cleveland has the Cuyahoga River and Lake Erie into which the Cuyahoga empties. Chicago has the Chicago and Calumet Rivers and Lake Michigan into which these rivers empty. The program of complainants would place Chicago in the same or worse position than Cleveland is now with the discharge of an immense amount of wastes into its water supply. Cleveland has filtered and chlorinated and is filtering and chlorinating its water supply. It is carrying out a program for the purification of its sewage to alleviate the nuisance conditions in the Cuyahoga River and in Lake Erie and to reduce the danger to its water supply. After the program is carried out there will still be the effluent from treatment works going into the Lake, together with storm water pollution from the Cuyahoga River and other sources

> "which would be unavoidable. There are other methods which include doubling up on coagulation and doubling up on filtration. After all of these things have been done, if it is desired to provide a still better water supply, the only way would be to keep the sewage pollution out of the lake or move the intakes to some other point from where they were located." (Ellms, Joint Abst., 238.)

To move the intakes away from pollution would be practically impossible due to the rapid and extensive travel of pollution in the Lake extending 20 or 30 miles. (Master's Exhibit B, Joint Abst., 164-168; Dr. Evans, Joint Abst., 273; George W. Fuller, Joint Abst., 555.)

Defendants' witness George W. Fuller has had a vast and varied experience, not only in the solution of problems of water supply and sewage disposal (Joint Abst., 548-549) in many cities and localities throughout the United States, but, he, also, has studied particularly for many years the problems confronting the Sanitary District of Chicago. He testified as to the various means to obtain a fairly suitable water supply, as follows (Joint Abst., 550-551):

> "The means available for taking care of the water supply problem at Chicago are related to the five items which are generally available in getting a fairly suitable water supply. One of those barriers against pollution is to start out with pure water which does not need any purification or which is particularly protected by diversion from becoming polluted. Secondly, there is the question of taking advantage of means of purification which are natural agencies, self-purification, which is taking place in lakes and reservoirs and streams within certain conditions. Then there is the sewage treatment method of preventing disastrous effects of a pollution by treating the sewage before pollution gets into the source of water supply. Then there is water filtration, and, finally, there is chlorination. There are five different steps or lines of defense available in different cities and under different conditions."

If Chicago is deprived of the first and foremost barrier, namely, the diversion of the pollution, then it never will be able to obtain that standard of water available to it when the other four mechanical barriers or lines of defense mentioned by Mr. Fuller as above stated are provided.

V.

THE PRACTICABLE MEASURES REQUIRED FOR THE DISPOSITION OF THE SEWAGE AND WASTES OF THE SANITARY DISTRICT OF CHICAGO, DO NOT EMBRACE THE CONSTRUCTION, INSTALLATION AND PLACING IN OPERATION OF FILTER PLANTS BY THE CITY OF CHICAGO FOR ITS WATER SUPPLY, THE EXTENSION OF INTAKE TUNNELS OR THE CONSTRUCTION OF A SUPER TUNNEL OR THE BUILDING OF A SEPARATE SEWER SYSTEM, THE PROVISION BY THE SANITARY DISTRICT FOR THE CHLORINATION OF THE EFFLUENT OF SEWAGE DISPOSAL WORKS AND CONSTRUCTION OF OUTFALL SEWERS OR TUNNELS FROM THE RESPECTIVE SEWAGE DISPOSAL PLANTS TO THE LAKE, OR THE UTILIZATION OF EXISTING PUMPING STATIONS OR CONSTRUCTING OF NEW PUMPING STATIONS TO PROVIDE CIRCULATING WATER FOR THE CHICAGO RIVER AND ITS BRANCHES, OR THE PROVISION BY THE SANITARY DISTRICT FOR PASSING THROUGH IMHOFF TANKS OR PRELIMINARY SETTLING TANKS A VOLUME AT STORM TIMES IN EXCESS OF 150 PER CENT OF THE DRY WEATHER FLOW.

(a) THESE WORKS WERE NEVER URGED BY THE COMPLAINANTS TO BE A PART OF THE PRACTICABLE MEASURES FOR THE DISPOSITION OF THE SEWAGE OF THE SANITARY DISTRICT OTHER THAN BY LAKE DIVERSION.

Complainants find fault with the Master's Report on the ground that these various works, such as filter plants, outfall tunnels, provision for circulating water and the others mentioned above, were not included by the Master as part of the practicable measures to be adopted to dispose of the sewage and waste of the Sanitary District, although in their requested findings submitted to the Master, they said:

> "The construction or installation of any such additional works or structures should be left to the discretion of the defendants." (Joint Abst., 666.)

Requested Finding VIII sets forth

> "the method or program for the complete treatment"

of sewage and industrial waste by means other than Lake diversion. It is so similar to the finding complained of that we set forth below, in juxtaposition, complainants' Requested Finding VIII and the Master's Finding excepted to.

Complainants' Requested Finding VIII—"The completion of the North Side and West Side sewage disposal plants on the activated sludge principle, the completion of the Calumet plant on the trickling filter principle, and the construction of the Southwest Side sewage disposal plant on the activated sludge principle, together with the completion or construction of such additional sewers and pumping stations as may be necessary to convey all of the sewage to said respective sewage disposal plants, will provide a practical method or program for the complete treatment of all of the sewage and industrial waste of the Sanitary District by means other than Lake diversion." (Joint Abst., 665)

Master's Finding to Which Complainants' Except—"That the completion of the North Side, West Side, Calumet, and Southwest Side Sewage Treatment Works, above described, with their appurtenances and the necessary intercepting sewers, and the efficient operation of these plants, will afford practical measures from the standpoint of present sanitary engineering knowledge for the complete treatment of the dry weather flow of sewage and wastes of all the area comprised within the Sanitary District of Chicago." (Master's Report, p. 141)

The construction of filter plants for water supply, extension of intake tunnels, construction of a super tunnel and the building of a separate sewer system costing upwards of $500,000,000, would be required to be done by the City of Chicago, not a party to the suit, and against whom no relief was sought or given by the Court's opinion of January 14, 1929. The relief is against the Sanitary District. The Court said:

> "The situation requires *the District* to devise proper methods for providing sufficient money and to construct and put in operation with all reasonable expedition adequate plants for the disposition of the sewage through other means than the Lake diversion." (Opinion, Appendix p. 19)

Again the Court said:

> "our decree should be so framed as to accord to the *Sanitary District* a reasonably practicable time within which to provide some others means of disposing of the sewage" (Opinion, Appendix p. 17).

(b) THE FILTRATION AND OTHER WORKS, NOW DEMANDED BY COMPLAINANTS, WOULD NOT PRODUCE A DEPENDABLE WATER SUPPLY AND PROTECT SHORE WATERS AND NAVIGATION (MASTER'S REPORT, PP. 136-140).

Complainants' witness Ellms said (Joint Abst., 632):

> "The pollution affects the use of water for recreational purposes and for bathing, and it affects fish life and recreational boating to some extent. It depends, of course, upon the degree of pollution of the shore waters, but it certainly would become more or less objectionable, I imagine; that is, if very large volumes of untreated sewage are turned directly into the Lake. The floating solids are the things most objectionable from the point of view of boating and bathing. It is true that a person in a launch or sailboat or rowboat is liable to become infected."

Mr. Ellms also testified (Joint Abst., 228) that:

> "The works constructed or to be constructed, as proposed by the Sanitary District under this program, are, from the standpoint of present knowledge of the art of sanitary engineering, the best possible works to be constructed from any practicable standpoint to completely treat the sewage arising within the District. Even though that program is completely carried out, there will be some matter of sewage origin at times in the Chicago River and its branches which has not received treatment."

He also stated (Joint Abst., 229):

> "The Lake Michigan water would be affected by that sewage effluent."

The conditions at Cleveland are described by the report of the Municipal Research Bureau of March, 1926,

and the statements made in the report of 1926 are repeated in the similar report of May, 1928. To this statement Mr. Ellms subscribed, and the statement is as follows (Joint Abst., 232):

> "A canvass of those with experience of lake front conditions discloses that deposits of feces and other objectionable animal and vegetable wastes are common on the beach, especially after storms. Similar matter may usually be observed floating and decomposing on the water and matter with finer suspended material causing unpleasant odors. Oil and grease in sufficient quantities to befoul the beaches also are reported. Observations indicate that discharge of storm water from the interceptor system is most responsible for the coarse matter deposited. It is probably true that treatment of sewage now discharged into the river would not eliminate the oil nuisance, but it would put the city in a much better condition to discover and control the sources of such waste."

Mr. Eddy, defendants' witness, in speaking of the plan recommended by the Board of Review of the Sanitary District, which plan was similar to the present sewage disposal program of the Sanitary District, in 1927 said (Joint Abst., 575):

> "The program recommended by the Board of Review, which includes the Canal and River system which was in use and is now in use, in my judgment, will protect the water supply better than any other method, and will also protect the shore waters and bathing waters as well as they can be protected.
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> * * * * *
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> In my judgment, there is no other plan which is practicable to adopt, or with which it is possible to secure the same degree of protection, coupling the two words 'practicability' and 'possibility.' The system which has been adopted, coupled with the program, will continue to efficiently divert the sewage and storm water and protect the water supply and the shore water. To abandon the system which has been built and which is capable of performing

the functions stated, in my judgment, would be a serious backward step from the point of view of sanitary engineering and public health. Failure to take advantage of these natural opportunities, in my judgment, is not justified.

From an engineering standpoint it is necessary, for the protection of the health of the community, to keep the sewage away from the Lake, and it is highly desirable for the protection of the shore waters for recreation and other purposes."

Concerning the effect of storm overflows, Mr. Eddy said (Joint Abst., 577):

"In times of low or small overflows, the proportion of the total volume of sewage produced, which is discharged into the canal system, is small, whereas, in times of great overflow the proportion of the sewage escaping is very large, and may be as much as 90 or 95 per cent of the total dry weather flow escaping with the storm flow.

These discharges of storm pollution, whether it be from the surface of the streets or from the sewers, are a serious menace to the purity of the waters along the water front. If allowed to be discharged into Lake Michigan they would seriously pollute and contaminate bathing beaches, and would render offensive and objectionable the waters along the parks and in the enclosures at the water front, and seriously pollute the water supply."

Master's Exhibit B, being the report of Alvord, Burdick & Howson, of April 16, 1925, states:

(Joint Abst., 161) "It must be a part of any scheme for sewage disposal that the water supply should be protected against any possibility of sewage contamination. Unless this is accomplished sewage disposal fails in its principal requirement.

This matter is particularly important to municipalities located on the shores of the Great Lakes. In all of these cities the lakes constitute the only practicable means for municipal water supply. In many instances the lakes are the only practicable means for sewage discharge.

In the Chicago region the means has been pro-

vided through the drainage canal, by which the great majority of all impurities are diverted from Lake Michigan."

(Joint Abst., 165) "The question as to the travel of pollution in the waters of Lake Michigan has been studied very thoroughly upon several occasions covering the Chicago water front, the water front opposite the Chicago north shore suburban towns and further north and along the lake at Racine and Milwaukee. The results of these studies indicate similar conditions wherever sewage contamination reaches the lake and variable winds and waves are available for dispersion. The net results from these studies are well summed up by Major W. V. Judson in his paper on currents in Lake Michigan, (first report Lake Michigan Water Commission, page 67).

'In my opinion the currents of Lake Michigan are so irregular in character that nothing would be gained worth the cost if attempt were made to obtain classified further data of a general nature. If it is a question of protecting the water supply of any particular locality, in any event, special study would have to be made inasmuch as the lake currents, available as they are, are much influenced by local conditions.

We do know, and perhaps it is enough for the purposes of this commission, that occasional currents of considerable velocity, say several miles per hour, may be expected to arrive from almost any direction at any point reasonably near either shore of the lake. It is, therefore, apparent that in a general case if the waters of the lake are polluted by the discharge into it of large quantities of sewage, then, practical localities in the lake, even twenty or thirty miles distant from the point of entrance to the sewage, are not safe places in which to derive water for domestic use.'"

* * * * *

(Joint Abst., 167) "There are certain conditions in storms when pollution may travel with great rapidity to a Water Works intake. The situation is much like the dissipation of smoke from a tall chimney. In relatively calm weather it may disappear within a short distance from the chimney. Under a

current of wind it may stream out in one direction, traveling for miles. Pollution in a lake may travel in similar manner."

* * * * *

(Joint Abst., 169) "Chicago is entitled to a clean water, safe from a Sanitary standpoint 365 days per year. This standard is generally demanded throughout the United States."

Mr. Fuller stated with reference to effects of storm overflow (Joint Abst., 550):

"The storm overflow into the Chicago River and into the Calumet River is a very important item in the solution of the problem of water supply, because that method of disposition of sewage in the area of the Chicago Sanitary District, as well as from Lake Michigan, is intricately tied up to the question of water supply and the flow away from the Lake down the Drainage Canal."

Complainants' witness Townsend, concerning the conditions at Milwaukee, where there is complete treatment of the sewage by the activated sludge process, described the pollution which exists there at storm times (Master's Report, p. 133):

"I have no figures with me upon which I can state the proportion of the sewage in storm flow passing into the river or the lake through the old outfalls at rain and thaw periods. There are overflows at the foot of a majority of the streets passing directly into the three rivers carrying raw sewage. However, the worst of the polluting material from the streets and deposits in the sewers is taken into the intercepting sewer. Afterwards the sewage diluted with storm flow passes directly into the river.

I made no tests to determine the correctness of the statement as to the worst of the sewage going into the plant, except that we have found through operation that on the crest of a great many storms the material received is unusually foul. Lots of that goes directly into the lake or rivers through these outfalls."

Mr. Fuller described the difficulties of obtaining a safe

water by the use of mechanical barriers (Joint Abst., 558-560):

"I am aware that filtration and extension of intakes would handle reasonable loadings as regards pollution, but after installation there are elements coming from flood flows where winds will carry dirty water fifteen or twenty miles and adding to that the question of failures and weaknesses and breaks and lapses incident to operating filtration plants. I am familiar with those faults of operation and know that there are times when the efficiency of filtering falls off materially.

Storms bring to a filtering plant water which needs a change in the amount of chemical treatment. This may happen at three o'clock in the morning with a sleepy attendant, to whom that line of work is an old story. They do not make the adjustment. The pollution gets away and goes into the water supply of the city. They do not know it. The citizens do not know it. They drink it. There are unfortunate results, dependent on whether the water or its bacterial content happens to carry disease germs.

There is another fault that comes from breaks in pipes and connections and arrangements which cannot be immediately corrected and sometimes are not detected. There is the question of efficient maintenance. After a long period of use filters get out of condition. Failure to make current repairs as needed causes a portion of the sand bed to become entirely impervious. Wash and the water fails to clean that sand or disturb that mass, causing the filters to get out of condition. It becomes larger and larger. The water does not penetrate it. The time comes when if the water should go down at the average rate of two gallons per square foot there is a falling off of efficiency.

The people to whom the operator in charge reports do not realize the importance of such conditions, and that raises the fourth weakness, the failure of administrative or executive authority to support the operator.

* * * * *

Referring to the five barriers or lines of defense against infection of water supply, the most nearly

practicable one is that one which provides naturally pure water protected against pollution, which is better than any line of defense in securing a hygienically safe water supply. Pure water does not carry hazards or lapses due to errors or unavoidable mistakes which occur in the operation of purification plants."

See, also, Mr. Eddy's statement (Joint Abst., 575).

Mr. Eddy also testified that in his judgment, with complete sewage purification works installed, no diversion of any kind from the Lake, but discharge of all wastes to the Lake, with filtration and chlorination of the water supply, the domestic water supply of Chicago would not be as good as under the program for the diversion of the sewage and wastes from the Lake, and under these conditions

"the sewage and storm water discharged into the Lake would at times—how often it is impossible to predict—in my judgment reach the intake, even if it were carried as far north and east as off Wilmette" (Joint Abst. 580).

At Detroit in 1926, where the water was filtered and chlorinated, a break occurred in the operation of the filtration plant so that as a result of such break by reason of the filter plant becoming overloaded, 200,000 cases of diarrhea resulted (Joint Abst., 581).

Complainants' witnesses on the subject of sewage disposal and water supply have had little experience as compared with the similar witnesses of defendants. The study and investigations they have made to qualify them to testify concerning the particular problem at Chicago, are meagre and negligible. The only complainants' witness who had made any particular study of the Chicago situation was Howson, and his report made on April 16, 1925, to the Chief of Engineers (Master's Exhibit B, Joint Abst., 114-191), nowhere recommends, but on the contrary condemns, a program of discharging Chicago's

drainage and wastes into the Lake after complete treatment of the sewage is obtained and after the water supply is filtered and chlorinated.

Mr. Ellms subscribed to his report published in the Canadian Engineer of April 30, 1926, entitled "Pollution of Boundary Waters — Problems of Cities on Great Lakes," in which it was stated (Joint Abst., 631):

> "that there is no question that the natural sources of dilution should be availed of, but that it should also be realized that there must be a limit to the ability of purification processes to make safe from a sanitary standpoint waters which have once been contaminated."

Mr. Ellms also subscribed to the following statement from his work entitled "Water Purification" (Defts. Abst., 932, 933):

> "that the pollution of the Great Lakes is to a large extent local, but since these communities draw their water supply from the same source the problem of preventing the contamination is a troublesome one; that the common remedy of extending intakes has been resorted to with fair success and with marked decreases in the typhoid rate; that the City of Chicago has diverted a large part of its sewage, thus keeping a constantly increasing volume of sewage from polluting the Lake water farther and farther from the shore; that other large cities are contemplating partial purification of sewage, and that the effect of wind on these large bodies of water is causing currents; that the influence which the shore lines may have on these currents and the movement of ice polluted with sewage from the shores out into the Lakes in the spring months are all factors which may at times be the cause of waterborne epidemics."

Mr. Ellms also stated (Joint Abst., 634):

> "The size of the city has something to do with the question of providing a water supply."

He was there referring to cities located on the Great Lakes.

Dr. Mohlman, a graduate of the University of Illinois in 1912 with the degree of Bachelor of Science, and employed by the Sanitary District of Chicago as director of laboratories for the past ten years, has had very active and extended experience in the investigation and analyses, from a chemical and bacteriological standpoint, of the waters in and about Chicago and elsewhere. He testified as to the conditions that will exist under the various hypotheses presented here for the discharge of sewage effluent, storm water containing sewage and drainage into the navigable waters of the United States, consisting of the Chicago River channels and the Canal System of the Sanitary District, and Lake Michigan waters on Chicago's water front. (Joint Abst., 338.)

As further qualification for the opinions given, he testified to making a most thorough examination and survey of the Menominee, Kinnickinnic and Milwaukee Rivers and the waters of Lake Michigan at Milwaukee.

Chicago has the North Branch of the Chicago River and the South Branch converging about a mile from the Lake, forming the Chicago River proper; the South Fork of the South Branch extending south to the industrial district at the stockyards and Packingtown; the West Fork of the South Branch extending westerly from a point near the junction of the South Fork and South Branch, with various arms and slips in which the water is more or less stagnant.

Milwaukee has the Menominee River, extending westerly from the Milwaukee River above its junction with the Kinnickinnic, the former flowing from the north and the latter from the south. From its junction with the Kinnickinnic the main stem of the Milwaukee River, carrying the waters of all three streams, flows to Lake Michigan.

From the beginning of the taking of testimony in this case on the sanitary phases, the complainants have exhibited Milwaukee as the ideal city, now of unassailable chastity from the sewage pollution standpoint, by the operation of the modern activated sludge plant recently placed in operation there, designed to treat and dispose of all the sewage of the population of Milwaukee proper and of additional population in its suburbs. Dr. Mohlman, in order to place himself in a position to give a more credible opinion as to what will exist at Chicago under the various conditions of discharge of the effluent from purification works, storm water, and drainage, commenced his survey about the first of June, 1929. The following quotation from Joint Abst., 339, shows the extent of this investigation:

> "In laying out this study of Milwaukee conditions I found it desirable, in order to extend our knowledge, to include the whole system as it is now in operation; namely, the sanitary condition of the Milwaukee River System from the standpoint of the oxygen content of the waters; the conditions of whether or not the rivers were flushed; the contrasts in condition of these rivers and all factors that I could find that would give me knowledge of what the conditions would be under such a program of complete treatment of sewage and interception of sewage from the river system and discharge of a sewage effluent and of the river water into the Lake. This required, in addition to the river studies, a careful survey of the bacteriological conditions along the Lake front, and this, in turn, required a subdivision to determine what effect such a program had on the bathing beaches of Milwaukee, and, secondly, on the Lake front and the harbor conditions off the mouth of the Milwaukee River.
>
> Our investigation started early in June, 1929; in fact, late in May. I had samplers on the river, out in the Lake and along the beaches. The river samples were taken in approximately 22 trips, extending from May 28th to August 30th. The samples taken

during these trips amounted to approximately 360, taken in these 22 trips; and these samples were taken from all parts of the Milwaukee River System, the navigable channels of this river system. Now, these, of course, were only the samples from the rivers. The samples from the Lake comprise approximately 400, as I recall it, and the samples from the beaches approximately 140. Somewhere around 900 samples altogether were taken.

Flushing was under way during our investigations, because I saw the water coming into the rivers from the flushing tunnels myself, that is, as to the Kinnickinnic and Milwaukee Rivers. There was no flushing of the Menominee River.

I attempted to estimate the amount of this flushing of the Milwaukee and Kinnickinnic Rivers by visits to the pumping stations that were in operation at the time, and also by having my assistants get what information they could regarding the amount and the time of flushing.

I made an investigation to determine the relation of the conditions of flushing.

I also made an investigation to determine the general trend of the drift of pollution in the lake at Milwaukee during that period.

I determined the B-coli index of water at the different bathing beaches in Lake Michigan along Milwaukee's Lake front.

I determined the dissolved oxygen content of the Menominee River where there was no flushing, and also the dissolved oxygen content of the water of the Kinnickinnic and the Milwaukee Rivers where there was flushing.

The Milwaukee River extends from the junction of the Kinnickinnic and Milwaukee Rivers to the lake. Of course, in all of these determinations I did not take all of these 900 samples personally, but I did take some of them personally, and I supervised carefully the collection, the place of collection, and the manner of collecting samples and the manner and methods of making the analysis of all of these samples.

All of this work was done under my direction by men who had been in the employ of the Sanitary District for some years, and they were competent.

I traversed these various rivers myself and observed the conditions of the Menominee River on various occasions, as well as the conditions of the Kinnickinnic and the Milwaukee Rivers, and the main stem of the river on four occasions, and collected samples on those same occasions out of the 22 trips I believe I mentioned previously.

On those occasions I observed the conditions of water with reference to odors and ebullition of gas and such things and the appearance of particles in the water, whether they were of sewage origin or not.

I observed everything that would lead me to form an opinion as to the sanitary condition of the entire water system.

Extending along the same period of time with the investigations that were made in Milwaukee, I arranged to have samples taken in Chicago from our beaches in as closely as possible the same manner in which the samples were taken in Milwaukee. I planned to have these samples taken on the same days, if possible, and by making the same analyses I drew comparisons as to the quality of the bathing beach waters in Milwaukee and Chicago.

* * * * *

In my examination of the water at bathing beaches at Chicago, I determined the B-coli index of the water, the same as I did at Milwaukee.

By B-coli index, I mean the number of B-coli per hundred cubic centimeters."

After stating his familiarity with the sewage treatment program of the Sanitary District as presented in this case, and the one which complainants' witnesses have stated is a good program, Dr. Mohlman gave an opinion as follows (Joint Abst., 342-343):

"I have an opinion as to what the conditions would be at Chicago in the Chicago River and its branches and the canals of the Sanitary District if the effluents from these sewage purification works, and storm water, are discharged to the Des Plaines River from the main drainage channel and if there is no water diverted directly from the lake, when these works

are in operation under this Sanitary District program.

* * * * *

I have made many studies of what the oxygen demand of these effluents would be, and I have also given consideration to other factors besides the question of the requirements of the effluents themselves. The complicated factor that makes it impossible for me to judge what the conditions will be in the future, with complete treatment, is that we do not know what the effect of storm water discharge, carrying sewage, will have on these streams. My opinion of the effect of such storm water solids is that they will form septic deposits in the river; that the oxygen will disappear except for a short distance below the activated sludge effluents, and that the condition of the channels will be objectionable. There will be deposits of septic sludge and a condition of pollution that will be highly offensive. That is in the absence of any diluting water from the Lake.

In my opinion there would be no dissolved oxygen in the waters of the Chicago River and its branches and the canal system, under the foregoing assumed conditions, except for a small amount of dissolved oxygen immediately below the discharge of the treatment plant effluents, but in the absence of diluting water, the water would be devoid of oxygen, and there would be objectionable conditions."

Dr. Mohlman further said, (Joint Abst., 343):

"I have an opinion as to the volume of water that will be required to be taken directly from Lake Michigan under conditions of discharge of all effluents, storm flow and drainage to the Des Plaines River, in order to produce unobjectionable conditions in the Chicago River and the canal system, and provide the necessary dissolved oxygen.

My opinion is based to a considerable degree on these studies that I have made in Milwaukee this summer. As I said before, I have made many computations on this question of what water will be required, and all of the estimates have been based on the oxygen requirements of the effluents from the

treatment works. I have not known what the effect of all other factors which enter into this will be. For example, we have deposits of solids in storm water discharge. I have not had any direct method of knowing what would be the effect of those solids in the river system, such as our Chicago system is. I have not been able to determine what would be the effect of flushing, if flushing were put into effect, toward the Lake. I have not been able to determine what other conditions would affect the sanitary condition of the Chicago system after our treatment plants are put in operation. But, having gained this knowledge of the effect of some of these other factors from my study in Milwaukee, *I believe that a substantial volume of diluting water will be required after the sewage treatment program of the Sanitary District is completed.* I base this to a considerable extent upon what was found in Milwaukee through our studies this summer, of the effect of those solids.

I believe that any hard and fixed ratio of dilution set at the present time is subject to unavoidable contingencies that make it undesirable to determine the exact amount of water at the present time. I believe that the exact amount can only be determined on the basis of very complete surveys such as we have made at Milwaukee this summer, only on a much more extensive scale. I feel that there are so many unknown factors affecting future conditions, that the exact amount cannot be determined until we know more about these practical, unknowable factors which enter into the problem.

By 'unobjectionable conditions' I mean conditions that will not allow the dissolved oxygen content to be depleted to zero; I mean conditions that will not allow black or septic condition of the river system; I mean conditions that will not permit evidence of sewage matter to be seen on the surface of the rivers.

The ebullition of gases occurs if solids are deposited in the river.

Assuming no discharge of any kind from the Drainage Canal to the DesPlaines River, the completion of the program of sewage treatment and the discharge of the effluents from these plants at

the places I have described or that have been described in the evidence, and the addition of 2,000 cubic feet per second from the Calumet Sag Channel at its eastern terminus, 2,000 second feet from Lake Michigan to the South Fork of the South Branch of the Chicago River, 1,000 second feet to the North Shore channel at its Wilmette terminus, I have an opinion as to what the condition of the water of the Chicago River and the Canal systems and the waters of Lake Michigan at and near Chicago's lake front will be.

The use of this volume of flushing water toward the Lake under the conditions mentioned would provide conditions in the Canal System such that in my opinion the system, including the channels of the Chicago River and its branches, would not be highly objectionable. On the other hand, the constant flushing of this volume of water, plus the content of the channels, into the Lake would ruin the bathing beaches and make them completely unsafe. I believe that it would contaminate the water supply and be in marked contrast to the present condition.

Based on my experience and my investgation that I have made and described, the B-coli indices at the various bathing beaches, I believe, contrasting our conditions with what I found at Milwaukee, would be a million or more. I have formed my opinion as to that point on the basis of what was found this summer at Milwaukee.

That is a million B-coli per 100 cubic centimeters.

I refer to all bathing beaches within a radius of five miles of the mouth of the Chicago River."

In 1905 the attendance at Chicago's bathing beaches was 51,722 persons. In 1908 and 1909 when the intercepting sewers were placed in operation, picking up the sewage of Chicago which had previously flowed directly into the Lake, the bathing beach attendance increased to approximately 600,000 persons each year. From then on the attendance each year rose by leaps and bounds until in 1928 it reached 8,751,123. This is a staggering number which should cause the stay of the hand of any one,

particularly a court of equity, contemplating the taking of any step or the doing of any act which would endanger the health and lives of this vast number of people using bathing beaches each year, or which would ruin the attractiveness of the waters used for such purposes. (Joint Abst., 327-333).

Complainants except on the ground that, as they say, the Master should have found that the preliminary treatment or tanks at each of the plants could be so operated or changed in design so that about 4,000 c.f.s. of sewage flow at storm times could be practicably passed through such preliminary treatment works. Complainants' witness Howson, after stating that he considered the defendants' program to be a "good program," said:

> "It would be wise to give the preliminary treatment to a larger per cent of the storm water overflow; that is, put it through the preliminary tanks and then by-pass it without putting it through the aeration tanks and secondary treatment. The program as a whole, with that modification, which is not essential, but which will somewhat improve it, is well adapted to the situation." (Master's Report, p. 20.)

Thus, Mr. Howson does not recommend such change.

Gascoigne, another witness, said:

> "If it were necessary to enlarge the different parts of the plants mentioned, my statement on direct examination was incorrect." (Joint Abst., 212.)

The Master found (Master's Report, p. 23):

> "The evidence does not, in my judgment, furnish a basis for a finding that enlargements are necessary in the sewage disposal plants as proposed in the program of the Sanitary District. The complainants state that the changes they propose in these plants relate to their operation."

The Master further said (Master's Report, p. 24):

> "As the suggested change does not appear to be regarded as an essential feature, its feasibility may

be left to be determined in the course of the actual operations."

With reference to chlorination of the effluent, defendants' witness Mr. Fuller stated (Joint Abst., 560-561):

> "I do not know that it has been established that chlorination of such an effluent does substantially and materially reduce the B.O.D demand of that effluent. There is a tendency in that direction, but it has never come within my range of observation."

Concerning outfall sewers the Master found (Master's Report, p. 137):

> "The suggestion that outfall sewers or tunnels might be built to take the effluents directly to Lake Michigan has been made in a general way, but the evidence is by no means convincing that it would be a reasonable requirement to compel the Sanitary District or the city to build such sewers or tunnels to take the effluents from the sewage treatment plants across the city to the Lake (*supra*, p. 134). The problem of the storm flow would still remain and would be especially serious in view of the volume which may be expected in the run-off of this large area with its great and growing population. The pumping of circulating water into the Drainage Canal and the Chicago and Calumet Rivers would, as pointed out in the testimony (*supra*, p. 135) carry whatever filth there would be in these rivers to the Lake more rapidly."

With reference to the separate sewer system mentioned in complainants' exceptions, the Master's findings are likewise conclusive (Master's Report, p. 24):

> "The complainants have not proposed the installation of a separate system of sanitary sewers. When the defendants presented testimony as to their estimates of the extremely heavy, and in their view prohibitive, cost that would be involved in that undertaking (estimated by William R. Matthews, engineer of the Bureau of Sewers of Chicago at over $400,000,000), counsel for complainants stated that complainants' program does not provide for any such sewer system; that the defendants had not ad-

> vanced any program involving the construction of a separate sewer system for Chicago nor had the complainants. 'Nowhere,' says the complainants' brief, 'have any of complainants' witnesses stated that there was any necessity to construct such a system.' No plans have been furnished by the complainants for a different system of interceptors."

Defendants' witness Eddy, concerning the value of the separate sewer system, said (Joint Abst., 576):

> "Those storm flows contain the sewage, as well as the storm water, and the storm water itself, if there were no sewage in it, is seriously polluted and contaminated."

Mr. Eddy further stated on cross-examination (Rec., 5322, Defts. Abst. filed with Master on Re-reference, 796):

> "If there were a separate sewer system and whether the storm sewage or flow were run down the River or into the Lake, is an important point. If you turn storm sewage into Lake Michigan, you have all the filth and contamination from your city streets. It is practically impossible to build in these days in the United States a duplicate system of sewers and keep your sewage out of your storm drains. It simply cannot be done. That means that through your storm sewers going into Lake Michigan, you are going to have sewage discharge in addition to the pollution from your storm water."

ASIDE FROM THE IMPRACTICABILITY OF THE FILTRATION AND OTHER WORKS, COMPLAINANTS SAY THE MASTER SHOULD HAVE INCLUDED AS PART OF THE PRACTICAL MEASURES FOR THE DISPOSITION OF THE SEWAGE AND WASTES OF THE SANITARY DISTRICT, THE FINANCIAL BURDEN WOULD BE UNBEARABLE. SEE DEFTS. EX. 1310 (JOINT ABST., 522-523).

From the above exhibit and the testimony of Matthews as to the cost of a separate sewer system, the following items of financial burden are shown:

Construction Cost		
Chlorination of effluent	$ 2,100,000	
Sanitary sewers	400,000,000	
Water filtration	53,000,000	
Super tunnel and crib	70,000,000	
	$525,100,000	
Interest during construction, upwards of	53,000,000	
Total construction cost		$578,100,000
Capitalized Annual Costs		
Operating, upwards of	$107,000,000	
Depreciation and obsolescence, upwards of	83,000,000	
Overhead, upwards of	28,000,000	218,000,000
Public Utility Damage		186,000,000*
Total		$984,100,000

*Note: See Complts. Ex. 18 (Joint Abst 204).

VI.

THE POLLUTION OF NAVIGABLE WATERS CAUSED BY THE INTRODUCTION OF SEWAGE HAS RELATION TO THE INTERESTS OF NAVIGATION. CONSEQUENTLY, THE DIVERSION FROM LAKE MICHIGAN, WHEN ALL THE SEWAGE TREATMENT WORKS ARE IN OPERATION, SHOULD BE FIXED WITH RELATION TO THE NEEDS AND INTEREST OF NAVIGATION WITH RESPECT TO THE NAVIGABLE WATERS, NOT ONLY, OF THE PORT AND HARBOR OF CHICAGO, BUT ALSO, OF THE DES PLAINES AND ILLINOIS RIVERS.

Wisconsin v. *Illinois*, 278 U. S. 367:

The Court upheld the permit of March 3, 1925, on the ground that it had relation to the interest of navigation and that the purpose of providing the diversion in the amount fixed by said permit was to prevent obstruction to navigation by sewage nuisance. (See Opinion, Appendix pp. 16-17).

New York v. *New Jersey*, 256 U. S. 296:

> "(304) * * * the use of the sewer would result in the *obstruction of navigation by the filling up and shoaling of the channels of the Bay.*

* * * waters would be *rendered unsightly* and *unhealthful* to persons using them *for commerce.*

* * * * *

(306) * * * the stipulation for treatment of the sewage, 'or through requisite lawful additional arrangements,' viz: (1) *There* will be absence in the New York Bay of visible suspended particles coming from this sewage; (2) there will be absence of deposits caused by it objectionable to the Secretary of War of the United States; (3) there will be absence of odors due to the putrefaction of organic matter contained in the sewage; (4) there will be absence on the surface of the bay of any grease or color due to the sewage; (5) there will be no injury to the public health due to the discharge of the sewage, and no public or private nuisance will be created thereby; (6) no injurious effect shall result to the property of the United States situated upon the Bay; (7) there shall not be a reduction in the dissolved oxygen content of the waters, due to this sewage, sufficient to interfere with major fish life. It is agreed that the Government shall have unrestricted opportunity to inspect the workings of the sewer system, by designated officials, and that full compliance at all times with the provisions of the stipulation referred to shall be made an express condition of any permit issued by the Government for the construction, maintenance or operation of the projected sewer system.

* * * * *

(307) * * * and we think the probabilities greatly in favor of this conclusion, having regard to the opportunity secured to the Government for inspection and observation of the treatment plant and and for determining the quality and content of effluent before it is discharged into the Bay and the effect which it may have on the water in the immediate vicinity of the outlet.

* * * * *

The intervention of the Government was allowed upon allegations that the inadequate treatment of the sewage proposed would result in *injury to navigation and commerce: by causing deposits of solid*

matter, to the extent of thousands of tons annually, which would fill up and shallow the channels of the Bay; by rendering the Port of New York less *serviceable and attractive to commerce* and offensive and *unwholesome* to persons *using* and living near it; and by causing injury to the *hulls* of *vessels* by the character of the *effluent* to be *discharged*.

(308) Having regard to the large powers of the Government over navigation and commerce

* * * we cannot doubt that the intervention of the Government was proper in this case.

* * * * *

(309) * * * the reasons given in the bill to justify the injunction prayed for are restricted * * * to the claims that the addition of the Passaic Valley sewage to the already polluted waters of the Bay would result, in odors offensive and unwholesome to persons bathing in them or *passing over them in large vessels or in small boats* or living and working upon the adjacent shores, in causing unsightly deposits on the surface of the water and chemical action injurious to the wood and metal of vessels navigating the Bay, and in rendering fish and oysters taken from such waters unfit for consumption.

The evidence introduced, as to increase of damaging *chemical action upon the hulls of vessels* by the *proposed addition of sewage*, and as to the danger from air-borne diseases to persons using the water in boats and vessels or working or dwelling upon the shore of the Bay, is much too meager and indefinite.

* * * * *

(310) It is much to be regretted that any forecast as to what the effect would be of the treatment and deeply submerged discharge through multiple outlets proposed for this large volume of sewage must depend almost entirely upon the conflicting opinions of expert witnesses, for experience with such treatment and dispersion under even approximately like conditions seems entirely wanting.

* * * * *

(313) We cannot withhold the suggestion, inspired by the consideration of this case, that the grave problem of sewage disposal presented by the large and

growing populations living on the shores of New York Bay is one more likely to be wisely solved by co-operative study and by conference and mutual concession on the part of representatives of the States so vitally interested in it than by proceedings in any court however constituted."

(a) THE EVIDENCE IS OVERWHELMING IN SUPPORT OF THE PROPOSITION STATED IN THE HEADING.

In 1929, with reference to the discharge of the effluent from these purification works into the Lake, Defendants' witness, Eddy said (Joint Abst., 75):

> "The discharge of the effluent from the various works to be completed under the program into the Lake, would be detrimental to navigation. The effluent would be devoid of oxygen, black and offensive much of the time. It would tend to discolor light-colored paint on boats. It would be offensive to people riding on boats and having to work on the vessels and along the wharves. This condition would gradually decrease in intensity as the distance from the mouth of the river increased, due to the dilution and oxidation which would take place in the waters of the Lake. And in reaching the above conclusion, I assumed that the storm water would be discharged to the DesPlaines River, and that the effluent from purification works in dry weather time would flow into the Lake."

Mr. Eddy stated his conclusions as to what would represent a reasonable standard for the waters of the Port of Chicago for navigation, as follows (Joint Abst., 76):

> "The *first* is that the water should be practically free from visible suspended particles of sewage matter coming from the sewage treatment plants.
>
> 2, the water should be practically free from oil, grease, color and suspended matter.
>
> 3, the water should not be obnoxious or effensive to, or injuriously affect the health of passengers and persons employed on vessels or other property used in connection with navigation.

4, the water should not create odors of putrefaction of organic matter.

5, the water should not be of such composition as to result in an excessive growth of water plants.

6, the water should not cause discoloration of paint on, or otherwise injure, vessels and equipment or other property employed in connection with navigation.

7, the water should contain at least three parts per million of dissolved oxygen."

The table in Defts. Ex. 1413, Doc. 417, 69th Congress, first session, "Pollution affecting Navigation or Commerce on Navigable Waters," shows numerous places where navigation has been seriously affected by the discharge of sewage and wastes into waterways (Joint Abst., 48).

That pollution of navigable waters affects sailors, is apparent from the testimony of Dr. Evans, defendants' witness, to the effect that typhoid rate is much higher among seamen on the Great Lakes than it is among civilians located in cities about the Great Lakes (Joint Abst., 267).

Dr. Knapp, Director of Laboratories and Food and Drug Control for the City of Cleveland, and first assistant to the Health Commissioner of Cleveland, acting in his stead at times, was subpoenaed as defendants' witness. He testified that epidemics of intestinal infection had been traced in the past to bathing in polluted water. While he said "circumstantially," he later stated that it is, only, by circumstances that the health authorities may determine the source of disease. (Joint Abst., 334). He further testified (Joint Abst., 334):

"During the years 1924 to 1928 all of the typhoid cases which occurred in the City of Cleveland were studied, those in which bathing might

have been under suspicion, regardless of whether it was in the City of Cleveland or outside of the city—a certain large percentage of cases in our city are so-called nonresident cases. In the study of those cases there were a certain number in which the only lead led to bathing, whether it was in the city or out of the city. A certain percentage showed a condition which we called 'no lead' or 'no lead cases,' but in which bathing might have been a factor. So, they were grouped on a paper which was published this last summer,—two sets of figures—a certain number of cases which were listed on our epidemiological report were traced to bathing. Then in another column was stated as 'bathing under suspicion,' meaning that some time during the incubation period of the disease the particular parties had been in bathing.

In other words, I traced some of these cases to bathing, circumstantially. In other cases they were under suspicion as having contracted typhoid fever at bathing beaches."

He also testified that in this examination and survey of the relation of typhoid fever to polluted bathing beaches, various cases arising during the bathing season at Cleveland for the years 1924 to 1928, both inclusive, were traced to bathing, and various other cases were suspected of being due to bathing; that the results were as follows:—out of 47 cases of typhoid fever during the bathing season of 1924 at Cleveland, 4 were traced to bathing, 9 were under suspicion as having come from bathing; in 1925, out of 29 cases, 1 was traced to bathing and 12 were under suspicion; in 1926, out of 48 cases, 4 were traced to bathing and 6 were under suspicion; in 1928, out of 32 cases, 5 were traced to bathing and 7 were under suspicion; that people were warned on account of pollution not to bathe in Lake Erie this season (1929). (Joint Abst., 335-336).

On August 1, 1912, the Governments of the United

States and of the Dominion of Canada, pursuant to Article 9 of the Boundary Waters Treaty of 1909 between the United States and Great Britain, submitted to the International Joint Commission the following questions, among others (Ex. 1166, Rec., 4995):

> "To what extent and by what causes and in what localities have the boundary waters between the United States and Canada been polluted so as to be injurious to the public health and unfit for domestic and other uses. * * * In what way or manner, whether by the construction and operation of suitable drainage canals or plants at convenient points, or otherwise, is it possible and advisable to remedy or prevent the pollution of these waters."

The Final Report of the International Joint Commission, dated September 10, 1918 (Ex. 1166, Joint Abst., 584-587) on this subject, stated:

(Pages 6-7):

> "Any conclusions the commission may reach and any recommendations it may make, may, if acted upon, affect the physical health of people who dwell along these waters, as well as the financial and other interests of eight States of the United States and three Provinces of the Dominion."

* * * * *

(Page 7):

> "The boundary waters are the natural channels of interstate and international commerce."

* * * * *

(Page 8):

> "In the working out the enormous possibilities of this vast section of the continent the proper observance of international sanitary requirements will be a most essential factor."

* * * * *

(Page 23):

> "The grossly polluted condition of boundary waters is doubtless the cause of the abnormal preva-

lence of typhoid fever throughout the territory bordering thereon."

* * * * *

(Page 24):

"Notwithstanding the general improvement, violent outbreaks of typhoid fever have occurred, and the potential danger must continue to exist in view of the extensive pollution of these waters and the limitations and inefficient operation of water-purification plants. Not only have the border communities suffered from this condition, but navigation interests have also been injured very severely from the disastrous outbreaks consequent on the use of polluted boundary water."

* * * * *

(Page 25):

"The city of Detroit discharges into the former all the raw sewage from its estimated population of 850,000. On the United States' side opposite Amherstburg the pollution of the river reaches the enormous figure of 10,392 B. coli per 100 c.c., and its waters from that point to Lake Erie and the waters of that lake within a radius of about 4 miles from the mouth of that river are very greatly polluted."

* * * * *

(Page 29):

"The pollution of drinking water supplies and of bathing waters at Bois Blanc Island, on the lower Niagara at the Thousand Islands, or at other summer resorts, or of the waters navigated by vessels and yachts, might not only be an injury to the immense number of citizens of both countries who would be brought immediately in contact with the pollution, but would indirectly be a source of great peril to hundreds of thousands more. To illustrate the danger the following citation is made from the United States Public Health Service Report for 1914, volume 29, page 393:

> It is stated that during one short period of the summer's cruise (referring to the voyage of a lake boat) 77 cases of typhoid fever developed as the result of the use of impure drinking

water taken from the Detroit River. * * * Investigations by this service of similar outbreaks on three Great Lakes vessels during the summer of 1913 showed that out of a total of 750 people there were over 300 cases of diarrhea and 52 cases of typhoid with 7 deaths.

The lamentable prevalence of typhoid fever referred to previously calls for consideration in this broad international view of the question of pollution of boundary waters."

* * * * *

(Page 32):

"It must be admitted that the conservation of public health is of paramount importance under the treaty."

* * * * *

(Page 33):

"The harm done by existing pollution to bathing resorts cannot be remedied except by preventing the discharge of sewage into the waters which flow to them. Contamination of the sources of the drinking supplies of these classes of people is a most serious matter. The millions whom it affects or may affect are more exposed to danger than are the urban inhabitants who draw their water supplies from public water systems."

* * * * *

(Page 40):

"Sewage-polluted drinking water constitutes an actual or potential menace to health, so much so that the presence of the bacterial organisms of water-borne diseases in the sewage of an urban community should always be assumed. While bacterial pollution is most serious in the case of waters used as sources of drinking-water supply, it is serious in the case of waters used for bathing, boating and other pleasurable exercise, and also, although to a less degree, in the case of shore waters on account of possible indirect infection through cattle and insects."

(b) CONSIDERING THE INTERESTS OF NAVIGATION ON THE ILLINOIS RIVER, AS WELL AS THAT AT THE PORT OF CHICAGO, THE EVIDENCE IS UNDISPUTED THAT APPROXIMATELY 5,000 C.F.S., INCLUDING DOMESTIC PUMPAGE, DIVERSION IS REQUIRED TO MAINTAIN UNOBJECTIONABLE CONDITIONS ON THE ILLINOIS RIVER.

Important navigation on the Chicago River to be kept up is navigation extending through the Illinois and DesPlaines Rivers to and into the Chicago River and vice versa. These boats, in order to get to the Chicago River, must pass along and through the Illinois and DesPlaines Rivers. If there are impediments to navigation in the Illinois and DesPlaines Rivers due to pollution or to lack of water to actually float the ships, then navigation of the Chicago River is impaired. The report of Alvord, Burdick & Howson (Master's Ex. B, Joint Abst., 114-191) finds that to maintain a proper standard of water for navigation in the Illinois and DesPlaines River, there would be required diversion from the Lake direct of 4,167 second feet. Defendants' witness, Mr. Eddy, in 1927 stated that after the sewage of Chicago was completely treated, a diversion from the Lake of

> "one cubic foot per second per one thousand persons would be satisfactory, possibly somewhat less." (Joint Abst., 584.)

GENERAL JADWIN'S TESTIMONY.

The circumstances under which General Jadwin was called to testify by the Special Master are set forth in the Master's Report, p. 90. It appears that the solution of the problem was presented by General Jadwin, as chief of the Corps of Engineers of the United States Army, who had the benefit of the advice and counsel of his subordinate officers, with due regard to the impor-

tance and gravity of the questions propounded by the Master.

The Chief of Engineers', Gen. Jadwin's, conclusions with reference to the question put by the Master's letter, above stated, were that by December 31, 1929, a diversion of 7,250 c.f.s. is necessary "to maintain tolerable conditions of navigation in the Chicago River"; that after sewage purification works were entirely installed, the minimum diversion, including water supply, should be 5,000 second feet or such other flow as may be determined by the Secretary of War and Chief of Engineers; that introduction of deposits of sewage in the Chicago River without dilution would render it foul and putrid, materially impairing the navigable conditions of the river through nuisance to navigators and those engaged in the loading and unloading of vessels; that with the attainment of the maximum practicable treatment of all sewage, some circulation of water will be necessary for navigation; that then the needs of navigation in the Chicago and Calumet Rivers proper may be found not to exceed a flow, directly from the Lake, of 1500 c.f.s. augmented by the natural run-off of the Chicago and Calumet Rivers and the effluents from the treatment plants, making an annual flow at Lockport of approximately 3200 c.f.s.; that 3,200 c.f.s. would not be sufficient to maintain proper conditions for navigation in the navigable waters of the DesPlaines and upper Illinois Rivers; that the term "navigation on the Chicago River" may be applied in a very restrictive sense; that a complete answer in the matter of diversion at Chicago cannot be given without regard to the physical relation which exists between the Port of Chicago and the great inland waterways system made up of the Mississippi, Ohio and Illinois Rivers and their tributaries, and the traditional policy of Congress

in improving waterways for commerce; that while the 1927 Rivers and Harbors Act specified that it did not itself authorize a diversion of water, the project directed by Congress provided for a 9-foot channel without specifying the manner in which this depth should be obtained; that the plans presented to Congress upon which said provisions of said Rivers and Harbors Act of 1927 were passed, were designed to provide a channel with the requisite cross section, with diversions from 1,000 to 10,000 c.f.s.; that it is not practicable to state now what the amount of diversion is that may be needed in the Chicago River to meet the requirements of navigation in a broad sense; that in addition to providing water for depths and widths of channels in the Illinois, the water should not be unreasonably offensive; that this subject had been studied by sanitary engineers employed by the Department; that such engineers advised that 4,167 c.f.s. total flow at Lockport was the minimum, assuming activated sludge methods of sewage purification to be installed for Chicago's sewage, to prevent the occurrence of nuisance in the Illinois and DesPlaines Rivers and permit fish life therein; that with too little diversion from Lake Michigan, the water in those rivers would be so foul as to menace the health of workers upon vessels and at terminals; that it is not possible now to specify the precise amount of water required many years hence with the growth of the city, changes in sanitary art and other developments not foreseen; that to allow for contingencies, the diversion was fixed at 5,000 c.f.s., measured at Lockport; that while local navigation on the Chicago River may be safeguarded by a total flow of 3,200 c.f.s. at Lockport, through navigation between Chicago and the Mississippi System will require about 5,000 c.f.s. to keep the water in the channels south of Chicago in acceptable condition with an as yet undetermined but

possibly greater flow required for the maintenance of adequate channel depths and widths; that the diversion above stated regarded as necessary for navigation, will reduce by one-half the lowering of the levels of the Lakes and the remaining effect can be cured by the construction of suitable compensating works in the connecting channels of the Great Lakes (Master's Report, pp. 90-96.)

General Jadwin was cross-examined very extensively by various counsel for complainants, and in the course of such cross-examination he stated that in determining the amount of the diversion in answer to the Master's said question put by his letter of February 22, 1929, he considered only the amount needed for navigation of the river, and did not consider the question of the health of Chicago; that people on board boats need substantially the same protection as the people in the city; that the diversion required for navigation on the Chicago River contemplates taking care of the navigation in the upper Illinois, in view of the fact that through navigation on the Chicago River must pass through that place and if navigators are not protected there, it would hamper navigation on the Chicago River; that the engineers who made the report to the Department on April 16, 1925, (Master's Exhibit B, Joint Abst., 114) used the standard for protection of fish life as the measure of suitability of water for navigation. (Joint Abst., 6).

On cross-examination, General Jadwin further stated that if complete treatment of sewage took place, there would still be need for diversion for navigation in the Chicago River; that there is very light draft present navigation from Lake Michigan to the Mississippi (Joint Abst., 13); that large contracts have been made for the improvement of the Illinois River under the Congressional Rivers and Harbors Act of January, 1927 (Joint

Abst., 13-14); that Congress under the 1927 Act provided for 9-foot depths and authorized the expenditure of a sum of money to obtain that depth of about three million as the maximum limit, which would call for a diversion of about 4,500 average c.f.s. (Joint Abst., 15); that his views as to the amount of diversion required to maintain proper standard of water for navigation, were obtained largely from the report of Messrs. Alvord, Burdick & Howson (Masters Ex. B); that if their conclusions are seriously questioned, the Department would be glad to obtain the views of other sanitary engineers; that the standard for thriving fish life was as low as could be gone to be sure that the water did not have so much foul matter in it as to become putrid and unreasonably offensive to navigation; that the standard for fish life was just a gauge and if the water supported fish life, it would be safe for navigators; that sanitary engineers were used in getting information, together with what came through the district and division engineers (Joint Abst., 16.)

General Jadwin, in answer to inquiries on cross-examination, further stated that the Rivers and Harbors Act of January, 1927, directed the Engineer Department to get a channel 9 feet deep and 200 feet wide at an expense of not to exceed 3½ million dollars, which left the Engineer Corps free to use their best judgment in the selection of the plans that could be used for the expenditure of such an amount; that the one selected by the Engineer Corps as the best plan was one which called for a diversion of approximately 4,167 c.f.s., which plan is now being carried out at large expenditure of money; that if less than 4,167 c.f.s. diversion exists, it would be necessary to restore state dams, which would not give what the Department considers to be reasonably free, easy and unob-

structed navigation; that each of the dams is an objection (Joint Abst., 18-21).

On cross-examination by defendants' counsel, General Jadwin stated that with the effluent discharged from these different plants flowing into the Chicago River and to the Lake, navigation would not be, according to the wording and spirit of the law, reasonably free, easy and unobstructed (Joint Abst., 22).

On further cross-examination by complainants' counsel, General Jadwin stated that it was his understanding that the effluent from sewage purification plants needs a considerable amount of water to get it out safely; that the amount of water necessary to add to the effluent is 5,000 c.f.s., including the water that is pumped (Joint Abst., 24); that he obtained his figures largely from his conferees; that while none were sanitary experts, they had the report of the sanitary engineers, Alvord, Burdick & Howson; that he obtained the 5,000 second feet by adding a factor of safety to 4,167 second feet which was worked out quite carefully by sanitary engineers, who were employed to find that amount for the Department and to find it in a disinterested way, which is the amount necessary to make navigation reasonably free, easy and unobstructed, which people on the boats are entitled to have; that between the District Engineer and said sanitary engineers, they took the standard of water to support a thriving fish life as a test for water which would be safe and secure for navigators; that storm water overflows into the harbors of other cities on the Great Lakes, some of which harbors General Jadwin's assistants had said were objectionable from a navigation standpoint because of pollution; that if counsel wished the details on that matter, he would be glad to have his assistants, Col. Schulz, division engineer for the entire Lakes, and

Col. Jones, who was formerly district engineer at Buffalo, give the details. (Complainants' counsel did not make any such request—Joint Abst., 22-27.)

On further cross-examination by complainants, General Jadwin testified that his statement as to controlling works with different diversions from 1,000 to 7,000 c. f. s. from the Lake (Master's Report, pp. 108-116) was prepared in co-operation with his associates; that it was assumed that Chicago will continue to discharge its sewage into the DesPlaines River (Joint Abst., 30); that the sanitary engineers, Alvord, Burdick & Howson, employed to make the report, recommended that there would be needed 4,167 cubic feet diversion for navigation; that the District Engineer agreed in that report; that there is no reason for changing it; that while Major Putnam, the District Engineer, was not a sanitary expert, he kept in close touch with the said engineers hired and he made a report based upon the information contained in the report of the engineers and from information he had received from them while in close touch with them, which report is contained in Document Number 4, Complainants' Exhibit 18, where the following is stated (Joint Abst., 36):

> "The consulting engineers are of the opinion that no appreciable nuisance will result if the following standard is maintained: Liquid discharged by the Drainage Canal, as evidenced by the average of representative samples taken for any 30 consecutive days, shall (a) be practically free from solid deposits in two hours; (b) shall contain not less than three parts per million of oxygen, and enough to equal or exceed the biochemical oxygen demand of said liquid for five days, when incubated at 20 degrees C.
>
> Whether adherence to this standard will produce exactly the results desired or not is unknown, but in view of the present extremely unsatisfactory conditions prevailing, with upward of 4,000 cubic yards of settleable solids being dumped into the Illinois

each day, and with periods of several months each year with no oxygen whatever present in the effluents, there is no question but what conditions will be improved materially.

It should be understood that other sources of pollution are tributary to the Illinois River, and that with no contamination whatever from the Sanitary District of Chicago, conditions in the Illinois will not be satisfactory until the rest of the communities now discharging their sewage in the System carry out satisfactory sewage treatment programs of their own. It so happens that the adoption of a standard that no appreciable nuisance will result, carries with it the restoration of conditions that will permit fish life to thrive."

General Jadwin further testified, on cross-examination by complainants, that Major Putnam had the full advice of these experts and was on the District at the time; that if the conditions would be unsanitary for the people of Chicago, they would certainly be a little more so for the people on boats; that unsanitary conditions interfered with navigation, that is, the unsanitary conditions that will result if you do not dilute the effluent to a certain extent which the said expert engineers have prescribed; that after the effluent has had several days to work, not properly diluted, it will make unsanitary conditions and will give off an odor and some gas; that if complainants' counsel desired, the Engineer Corps would hire some experts to get a formal report on that. (To this latter statement, complainants' counsel replied: "No, I don't want to bother you, General"); that it came to General Jadwin's mind as clearly as it has come and as he had endeavored to express it, finally and fully, in connection with the preparation for this case, that water unpolluted would be polluted after the described effluent had been discharged into it, and that such pollution in the Chicago River would obstruct navigation (Joint Abst., 37-43).

Complainants' witness Ellms testified (Joint Abst., 632):

> "The pollution affects the use of water for recreational purposes and for bathing and it affects fish life and recreational boating, to some extent. It depends, of course, upon the degree of pollution of the shore waters, but it certainly would become more or less objectionable, I imagine; that is, if very large volumes of untreated sewage are turned directly into the Lake. The floating solids are the things most objectionable from the point of view of boating and bathing. It is true that a person in a launch or sailboat or row-boat is liable to become infected."

Gen. Charles E. Keller, witness for complainants, testified on direct examination that:

> "* * * the presence or absence of pollution has nothing whatever to do with commerce or the extent of commerce."

But on cross-examination Gen. Keller said that in giving said answer, he excluded from consideration passenger traffic on the Great Lakes, the use of water for recreational purposes, boating, yachting, etc. (Joint Abst., 406.) He was of the opinion further that an impediment to navigation in the Milwaukee River due to sewage pollution would affect navigation between Milwaukee and Chicago. (Joint Abst., 410.)

(c) CONSIDERING ONLY THE WATERS OF THE PORT OF CHICAGO, 2,000 C.F.S., IN ADDITION TO DOMESTIC PUMPAGE AND RAIN WATER RUN OFF FROM THE LAKE IS REQUIRED FOR NAVIGATION.

See defendants' witness Eddy (Joint Abst., 80-82).

It was the opinion of General Jadwin (Master's Report, pp. 92-93) that 1,500 cubic feet per second direct from the Lake, in addition to the rain water runoff of the Chicago and Calumet River Watersheds and domestic

pumpage, should be the amount of the flow at Lockport, having consideration for the waters of the Port of Chicago only. The runoff of the Chicago and Calumet River Watersheds is approximately 500 cubic feet per second (Joint Abst., 86-87), which includes storm flow. This would give a total discharge at Lockport, assuming domestic pumpage to be 1,700 cubic feet per second (Joint Abst., 86-87) of 3,700 cubic feet per second when all the sewage disposal works are put in operation, according to General Jadwin. Mr. Eddy's opinion was that the total discharge at Lockport using the same values for the different elements, except the water to be diverted directly from the Lake, should be 4,200 cubic feet per second. To properly take care of the waters of the Illinois River from a navigation standpoint, according to General Jadwin, there would be required a total discharge at Lockport of approximately 5,000 cubic feet per second. The Master has recommended 3,200 cubic feet per second and has disregarded the waters of the Illinois River, presumably on the theory that he was not permitted by the opinion of the Court to go into that. It is our contention that the difference between the amount recommended by the Master and that required according to Mr. Eddy for the waters of the Port of Chicago, and the amount required according to General Jadwin for the Illinois River, is slight, and that the larger amount recommended by General Jadwin or by Mr. Eddy should be allowed and fixed by the decree.

THE SOLUTION OF THE PROBLEM AT CHICAGO AS PRESENTED BY THE SANITARY DISTRICT ENGINEERS AND AS APPEARS BY THE STATEMENTS OF GENERAL JADWIN, CHIEF OF ENGINEERS OF THE UNITED STATES ARMY, IS FURTHER IN KEEPING WITH THE MODERN TREND OF THOUGHT, CONGRESSIONAL LEGISLATION, AND OFFICIAL ACTION OF GOVERNMENT AND STATE OFFICERS, TO KEEP AND MAINTAIN NAVIGABLE AND OTHER WATERS OF THE UNITED STATES WHICH ARE UNPOLLUTED, IN THE FUTURE FREE FROM SEWAGE AND WASTE CONTAMINATION OF CITIES.

In

Missouri v. *Illinois*, 200 U. S. 496,

Missouri sought to enjoin Illinois and the Sanitary District from discharging Chicago's sewage into the Des Plaines River, and it was claimed that the sewage had the effect of contaminating the waters of the Mississippi River. Mr. Justice Holmes, in referring to the character of the nuisance claimed, took occasion to mention the difference between the sensitiveness of people to nuisances fifty years ago, as compared with their sensitiveness to such nuisances then (1906), and said (p. 522):

> "At the outset we cannot but be struck by the consideration that if this suit had been brought fifty years ago, it almost necessarily would have failed. There is no pretence that there is a nuisance of the simple kind that was known to the older common law. There is nothing which can be detected by the unassisted senses—no visible increase of filth, no new smell."

One need only mention the advancement in public hygiene regulations and in the attitude of people with reference to their private hygiene to immediately call to the mind of the youngest person connected with this case, numerous regulations of state, municipal and federal governments that have been made in the progress of

public hygiene, and also to call to mind numerous habits of the people in their private hygiene which tend to greater cleanliness and protection from diseases. The bacteriologists, in recent years, have learned much and have taught much. We find now drinking fountains and individual drinking cups in public places and in offices where there used to be the one drinking cup for all. The one towel for all has gone.

The United States Treasury Department has established a standard for drinking water, and water below such standard will not be permitted to be used by interstate carriers.

In

New York v. *New Jersey*, 256 U. S. 296,

New York sought to enjoin the discharge of sewage into New York Bay by the Passaic Valley Sewage Commissioners because it was claimed that the waters upon and adjacent the wharves and docks of New York City would be so polluted as to render them a public nuisance, offensive and injurious to persons living near or using them for bathing purposes, commerce, etc.

The standard of water for bathing beaches has been established as the standard for swimming pools, which is equivalent to the standard for the drinking water supply of the city, namely, the Treasury Department standard (Ellms, Joint Abst., 624).

Bulletin No. 83, Treasury Department, entitled "Sewage Pollution of Interstate and International Waters, with special reference to the spread of typhoid fever—II. Lake Superior and St. Marys River; III. Lake Michigan and the Straits of Mackinac; IV. Lake Huron, St. Clair River, Lake St. Clair and the Detroit River;

V. Lake Ontario and St. Lawrence River, by Allan J. McLaughlin," states (Ex. 1167, p. 133, Joint Abst., 502):

> "Chicago.
>
> The growth of the city of Chicago finds no parallel in history. From a population of 7,500 in 1843 it has grown to be the second city in the United States with a population in 1910 of more than 2,000,000. No argument is necessary to show the importance to the whole country of sanitary conditions in Chicago. Its vast commerce and giant industries make it the metropolis of an enormous territory and bring thousands of visitors daily from nearly every State in the Union. These visitors drink Chicago's milk and water and eat Chicago's food. Contamination of these articles of food or drink by typhoid fever germs means infection of the transients as well as citizens—transients who go to their homes in other States to establish new foci of typhoid fever. These transients and interstate travelers are less able to protect themselves against contaminated food or drink than the citizen who heeds the warnings of Chicago's excellent department of health. Thousands of interstate travelers drink water on trains which is taken aboard cars in this great railway center, and the character of Chicago's water supply is of vital importance to these travelers and to the States to which they are destined."

Recently by Act of Congress the Secretary of War made a report to the Committee on Rivers and Harbors, Document 417, 69th Congress, 1st Session, entitled "Pollution Affecting Navigation or Commerce on Navigable Waters." (Defts. Ex. 1413; Joint Abst., 45-52.) The Act of Congress directed the Secretary of War

> "to make such investigation as may be necessary to ascertain what polluting substances are being deposited into the navigable waters of the United States or into non-navigable waters connecting with navigable waters, to such an extent as to endanger or interfere with navigation or commerce upon such navigable waters or the fisheries therein." (Joint Abst., 45-46.)

Among other things, the report, June 4, 1926, made pursuant to said Act of Congress states (Joint Abst., 50):

> "The subject of pollution of waterways is one that is engaging the active attention of State and municipal governments throughout the United States. The investigation clearly indicates an awakened interest and an earnest desire to meet and overcome a condition which through lack of adequate control in the past has been permitted to exist and grow until public opinion has become generally aroused."

Lake Michigan has been kept free from contamination by the sewage and wastes of the population of Chicago, which population is substantially equal to the combined population of all cities exceeding 10,000 population on the Great Lakes in the United States. These wastes have always been discharged into the DesPlaines and Illinois Rivers which receive similar wastes from other communities along them. These rivers must be as they always have been, the natural discharge for the wastes of Chicago and those communities located on them. In that way Lake Michigan can be kept free from pollution by the wastes of Chicago providing waters suitable for the maintenance and promotion of navigation, recreational boating and bathing. The water supply of Chicago will not be forever impaired, and Chicago will have the opportunity to obtain the very best water supply possible with no barrier raised against it.

VII.

THE PROVISION FOR CONTROLLING WORKS AT THE MOUTH OF THE CHICAGO RIVER OR AT OR NEAR THE NORTHERN TERMINUS OF THE DRAINAGE CANAL TO PREVENT REVERSALS OF THE CHICAGO RIVER INTO THE LAKE, IS PART OF THE DEFENDANTS' CONSTRUCTION PROGRAM TO PROVIDE PRACTICAL MEASURES IN ORDER THAT THE AMOUNT OF WATER DIVERTED FROM THE LAKE WHEN ALL THE WORKS ARE IN OPERATION, MAY BE REDUCED TO THE LOWEST PRACTICABLE AMOUNT CONSISTENT WITH THE INTERESTS OF NAVIGATION AND PREVENTION OF NUISANCE TO THE VARIOUS INTERESTS INVOLVED.

The controlling works, a part of the defendants' program and recommended by the Master's Report, are to be installed either at the mouth of the Chicago River at or near Lake Michigan or at or near the northern terminus of the Drainage Canal. They have been described in the testimony. (Joint Abst., 283.) Those at the mouth of the Chicago River would consist generally of a lock and movable dam so constructed and operated that it may be closed, forming an absolute barrier to the flow of water into the Lake from the Chicago River at times of storm. At such times boats passing from the Lake into the Chicago River, or vice versa, would be locked through by means of the lock provided in the controlling works.

Those at the northern terminus of the Drainage Canal would consist of a lock and movable dam that would be so operated that at ordinary dry weather times the surface elevation of the water, east of the controlling works and towards the Lake, would be approximately 7 feet higher than the elevation of the water in the canal west of the controlling works and towards Lockport. At ordinary dry weather times there would be a flow through these controlling works towards Lockport to an amount

determined by the annual flow of water from the Lake and effluent from sewage disposal works that may be permitted. At storm times the movable dam would be so operated by lowering it that all storm water reaching the channels of the Chicago River and Sanitary District Canals, would be carried by the slope and current thus created away from the Lake and would be, thereby, discharged at Lockport to the DesPaines River. Thus at all times through the operation of these control works there would be no flow from the Chicago River into the Lake. Of course boats, passing from the Chicago River into the Drainage Canal and to Lockport and vice versa, would pass through the lock provided in the controlling works.

The reason for making provision for the installation of controlling works either at the mouth of the Chicago River or in the Drainage Canal is to make possible the control of storm flow more quickly than exists under present conditions with the control at Lockport, 36 miles from the Lake. Under present conditions with the larger diversion the control at Lockport is sufficiently direct to prevent flow from the Chicago River into the Lake, but with the diversion materially reduced, that control will not prevent such flow from the Chicago River into the lake. Hence the controlling works were suggested in order that the diversion may be reduced when all the sewage disposal works are installed to the lowest practicable amount consistent with the interests of navigation and its protection and to prevent nuisance to the other interests involved.

(a) THE COMPLAINANTS NEVER CONTESTED BY EVIDENCE OR OTHERWISE THE PRACTICABILITY OF SAID CONTROLLING WORKS BEING PROVIDED AS A PART OF THE PROGRAM OF PRACTICAL MEASURES FOR THE DISPOSITION OF THE SEWAGE AND WASTES OF THE SANITARY DISTRICT BY MEANS OTHER THAN LAKE DIVERSION.

The Master in his report states (p. 106):

> "Complainants' sanitary experts have not testified that these controlling works would not be needed."

(b) THE COMPLAINANTS FIRST PROPOSED CONTROLLING WORKS AS A PART OF THE PROGRAM FOR PRACTICABLE MEASURES IN THE 1926-27 HEARINGS AND THEIR WITNESSES, IN THE HEARINGS UPON RE-REFERENCE, TESTIFIED ON THE ASSUMPTION THAT SUCH CONTROLLING WORKS WOULD BE PROVIDED.

The question of these controlling works at the head of the Drainage Canal to accomplish the purpose above set forth, was first introduced into the case by the complainants in order to obviate objections to the reduction of the diversion. (Master's Report, p. 106.) Complainants' sanitary witnesses testified at the 1926-27 hearings on the assumption that such control works would be provided. An example of such testimony is as follows (Joint Abst., 640):

> "Assuming complete treatment of all of the sewage of the Sanitary District, no normal or dry weather diversion, but diversion of storm water overflow through the controlling works proposed near Western Avenue, replacement of the present water intakes by a super-tunnel located 4½ miles offshore, in the vicinity of Wilmette, and 20 miles from the mouth of the Chicago River, with chlorination only of the water supply, the public health conditions of Chicago, with special reference to the public

water supply, would be better than those presently obtaining."

To the same effect, see Rockwood (Joint Abst., 592), Ellms (Joint Abst., 621) and Gascoigne (Joint Abst., 649).

In the 1929 hearings on re-reference an example of the testimony on this subject by complainants' witnesses is as follows:

> "Assuming the completion of the program outlined by me and the installation and operation of control gates so as to divert all storm water overflow, but with no diversion or flow other than at times of storm, such a program would practically provide for the disposal of the sewage of the Sanitary District of Chicago without detriment to the water supply or the navigation of the Chicago River as a part of the Great Lakes-St. Lawrence system from a nuisance standpoint." (Howson, Joint Abst., 111.)

See, also, to the same effect, Gascoigne (Joint Abst., 208) and Townsend (Joint Abst., 217).

On this subject complainants' witness Ellms in detail described his understanding of the operation of such works, as follows:

> "I have taken into consideration the effect of the operation of controlling works at the North end of the Drainage Canal. I understood that these controlling works were to be operated at storm times so as to cause the discharge of all the sewage effluent and all the storm water into the DesPlaines River from the Sanitary Canal in times of storm. From a sanitary standpoint, having consideration for a water supply and conditions of navigation in the Chicago River, I understood that the storm period when the controlling works would so operate would be from 4 to 5 hours. It would be necessary to put these controlling works in operation some hours before the storm commenced. It would be necessary to keep the controlling works in operation as stated during the period of the storm. I understood the

purpose of the operation of these controlling works to be to keep the storm water flow out of the lake, and also any other substance that was in the Chicago River or its branches at that time. That was in order to keep the filth or pollution out of the lake due to the storm and to discharge it to the DesPlaines River. It would be necessary to keep these controlling works in operation after the storm only for such length of time as the storm flow was in operation,—that is, as long as the flood flow continued, until it was back into a normal flow. That is, not necessarily back to a dry weather flow but to an average flow that would take away the principal portion of the flood water. That is, it would be necessary to keep the controlling works in operation as long as there was any storm water passing from the sewers directly into the river and that did not go through the sewage purification plants. It would be necessary to keep those controlling works in operation for some time after that in order to remove from the Chicago River and its branches and from the canal the dirty, polluted water that had accumulated there during the period of the storm and the flow due to the storm." (Joint Abst., 229-230.)

Thus it is apparent that these control works were first submitted at the 1926-27 hearings by the complainants as practicable in order to prevent flow of the Chicago River into the Lake at times of storm and to remove the objections to the interests of navigation in Lake Michigan, nuisance to bathing beaches and interference with Chicago's water supply in the event storm water with its untreated wastes were permitted to find their way into the Lake.

In the 1929 hearings on the re-reference, defendants accepted these suggestions and included controlling works as part of their program for practical measures to dispose of the sewage and waste of the Sanitary District. The complainants did not offer any testimony or evidence to the effect that such works "would not be needed". On the contrary, in the 1929 hearings all their

sanitary experts drew conclusions as to the effect of the various measures proposed with controlling works installed to be operated for a certain time before, during and after storms, in order to prevent storm water being carried into the Lake.

On the assumption that the controlling works at the north end of the Sanitary Canal should be operated only at storm times in the manner mentioned, with the effluent from sewage purification works going into the Lake at ordinary dry weather times, defendants caused a study to be made of the amount of water that would be required to be taken directly from the Lake to accomplish this purpose, as stated by Ellms above, the results of which were presented by witnesses Ramey and Woodward (Ramey, Joint Abst., 281-294; Woodward, Joint Abst., 295-304).

Mr. Ramey concluded that there would be required in the operation of the control works to accomplish the purposes above stated (Joint Abst., 289):

> "an annual average discharge at Lockport to the DesPlaines River of approximately 4,100 second feet, composed of 2,750 second feet direct diversion from the waters of Lake Michigan, 550 second feet estimated annual average rainwater run-off of the Chicago River Drainage Area, plus a portion of the rainwater run-off of the Calumet River, and in addition approximately 800 second feet of sewage treatment plant effluent."

According to the conclusions above stated by Mr. Ramey, he

> "assumed that save at times of flood run-off, the effluent from sewage purification works would go into Lake Michigan." (Joint Abst., 290.)

The addition of 500 or 600 second feet to the 4,100 second feet flow at Lockport, and a small addition for factor of safety, would keep all storm water and sewage effluent at storm times and at all other times, out of Lake

Michigan; and on this subject Mr. Ramey said (Joint Abst., 290):

> "To keep all effluents out of Lake Michigan, there would be required in addition to the 4,100 second feet flow at Lockport stated by me, some 500 or 600 second feet, on the assumption that the Lake would remain still, which would be the balance of the sewage treatment plant effluent not discharged to the DesPlaines River during flood run-off and during the period of flushing the storm flow out of the different channels, as I have above outlined. But I believe there would be required two or three times that much in order to be sure that you could maintain flow from the Lake and keep that effluent moving towards Lockport.
>
> To keep all storm water and sewage effluent at storm times and at all other times from Lake Michigan, substantially and effectively, there would be required at least 5,000 second feet of water directly from the Lake.
>
> With 5,000 second feet there would be numbers of small reversals when the water that was in the main river would get into Lake Michigan."

Professor Woodward agreed substantially with Mr. Ramey's conclusions as to the results of the operation of controlling works for the purposes above mentioned. But Professor Woodward was of the opinion that to keep all sewage effluent from the Lake, including storm water and drainage, there would be required 5,734 cubic feet per second discharge at Lockport. His estimate exceeded Mr. Ramey's because he believed that the lower estimate was based upon the assumption that there would be

> "the highest degree of skill in operating the gates"

and he felt

> "somewhat doubtful whether they can be operated that skillfully." (Joint Abst., 304.)

It will be observed that the difference between the amount of water that would be taken directly from Lake

Michigan to operate the controlling works for a certain time prior, during and after storms to remove to the DesPlaines River the polluted water flowing into the channels of the Chicago River and its branches and of the canals of the Sanitary District, according to the program of the complainants, (the effluent, however, at dry weather times going into the Lake), and the amount that would be required to keep at all times all effluent from sewage disposal works and storm water and drainage out of the Lake, is only a few hundred cubic feet per second, a very negligible quantity.

(c) UNLESS SUCH CONTROLLING WORKS ARE INSTALLED, IT WILL BE IMPRACTICABLE, AS THE MASTER FOUND, TO REDUCE THE DIVERSION BELOW 6,500 CUBIC SECONDS FEET.

The Master's Report states (p. 107):

> "My conclusion is that there is no adequate basis, so far as the testimony on the hydraulics of the river and canal is concerned, for a finding that pending the completion of the sewage treatment program it would be proper to require a further reduction of the annual average direct diversion below 6,500 c.f.s. without the installation of new controlling works."

(d) THE DRAINAGE CANAL AND THE CHICAGO RIVER ARE NAVIGABLE WATERS OF THE UNITED STATES, AND IT WILL BE NECESSARY, BEFORE SUCH CONTROLLING WORKS MAY BE INSTALLED, THAT THE PLANS THEREFOR SHALL BE APPROVED BY THE SECRETARY OF WAR, ON THE RECOMMENDATION OF THE CHIEF OF ENGINEERS, UNDER SECTION 10 OF THE RIVERS AND HARBORS ACT OF MARCH 3, 1899. (See Master's Report, p. 81.)

The Master's Report requires that the Sanitary District shall immediately submit plans for these controlling works and shall construct the said controlling works

within two years after plans therefor have been approved by the Secretary of War, on the recommendation of the Chief of Engineers. Under Section 10 of the Rivers and Harbors Act, all obstructions to any navigable waters are prohibited unless affirmatively authorized by Congress except that the Secretary of War on the recommendation of the Chief of Engineers, may approve certain structures and obstructions in said Act mentioned. Such structures when built with the approval of the Secretary of War are lawful structures. It is obvious that the placing of the control works at the mouth of the Chicago River or in the Drainage Canal, as proposed, will affect the navigable capacity of such navigable waters and will amount to obstructions therein. There seems to be no question that the approval of the Secretary of War of plans for controlling works in the Chicago River is necessary. But complainants have taken exception to the Master's requirement of approval of plans as to the controlling works in the Drainage Canal on the ground that, as they say, the Drainage Canal is not a navigable water of the United States. The Sanitary District Main Channel where these controlling works will go, forms a route of continuous travel by water between the Chicago River and the DesPlaines, another navigable water of the United States. It is the connecting link between the Chicago River and the Illinois and Michigan Canal and the Illinois Waterway now under construction. The Sanitary District Canal between Lockport, its southern terminus, and the Chicago River, its northern terminus, has replaced the old Illinois and Michigan Canal between those two points.

In *Mortell* v. *Clark*, 272 Ill. 201, 214, it is said:

> "The Sanitary's District's main channel as now constructed, practically complies with this Act (speaking of the Illinois-Michigan Canal Act) and furnishes a canal more suitable for navigation than the Illinois and Michigan Canal."

Furthermore, the Sanitary District Act, Section 24, provides that when the channel is completed and the water turned in to the amount of 300,000 cubic feet per minute "the same is hereby declared a navigable stream." *People* v. *Economy Power & Light Company,* 241 Ill. at 329.

In

Ex parte Boyer, 109 U. S. 628,

it was held that the District Court of the United States for the Northern District of Illinois had jurisdiction over a collision between two canal boats on the Illinois and Michigan Canal. The court said that navigable water situated as this canal is, used as a highway for commerce between ports and places in different states, is public water of the United States even though the canal is wholly artificial and wholly within the state and subject to its ownership and control. This case was cited with approval in *U. S.* v. *Cress,* 243 U. S. 316.

In

Perry v. *Haines,* 191 U. S. 17,

it was held that the Erie Canal was navigable water of the United States although it was created by artificial means and wholly within the boundaries of one state. The court pointed out that the only distinction between canals and other navigable waters is that they are rendered navigable by artificial means;

> "We fail to see, however, that this creates any distinction in principle",

as they are usually constructed to connect waters navigable by nature and are usually navigated by the same vessels which ply between the naturally navigable waters at either end of the canal.

The Drainage Canal has been for upwards of 30 years dedicated for and used as navigable waters. For the

last 20 years it has been used in place of the old Illinois and Michigan Canal as the link, approximately 28 miles, of the waterway from the Chicago River to the Mississippi.

In

DuPont v. *Miller*, 310 Ill. 140,

the adjoining owners on the DuPont Slip, extending about 900 feet from the Chicago River, filed a bill to enjoin Miller, Director of the Department of Public Works, from interfering with the complainants filling the slip. It had been excavated many years ago and had been used as a place for the anchorge of boats for loading and unloading their cargoes. It of course connected with the Chicago River and boats navigating such river and desiring to obtain cargoes or unload cargoes at the private docks of persons located on the slip passed into and from said slip. The Court held that, while the slip as originally located was upon private property, nevertheless it had become part of the public waters by long use and acquiescence, and said (p. 146):

> "A dedication of land or water to public use is defined as the appropriation or gift by the owner of the land or waterway of an easement therein for the use of the public. The act of dedication may be by deed or by opening the land or waterway without stating for what use, or by offering or permitting a public use with intention to so dedicate it."

(e) THE MASTER HAS FOUND THAT SUCH CONTROLLING WORKS WILL NOT MATERIALLY INTERFERE WITH NAVIGATION, AND HAS PROVIDED BY HIS FORM OF DECREE THAT THE DEFENDANT SANITARY DISTRICT SHALL IMMEDIATELY SUBMIT PLANS TO THE WAR DEPARTMENT FOR SUCH CONTROL WORKS AND THAT THE CONTROL WORKS SHALL BE CONSTRUCTED AND INSTALLED BY THE SANITARY DISTRICT WITHIN TWO YEARS AFTER THE DATE OF THE APPROVAL OF SUCH PLANS BY THE WAR DEPARTMENT. CONSEQUENTLY, AN EXCEPTION ON ANY PROGNOSIS THAT THEY MAY NOT BE BUILT IS WITHOUT MERIT.

Complainants take great exception, and it seems to us improperly, to the Master's report on the ground that the controlling works may not be built unless the Secretary of War, on the recommendation of the Chief of Engineers, approves the plans for such works. As the Master's Report and form of decree does not provide for the reduction of the diversion below 6,500 c.f.s., in addition to pumpage, even after all the sewage disposal works are constructed, until such controlling works are installed, complainants therefore say that the reduction below 6,500 c.f.s. may never take place. This is a hypercritical exception, in view of the Master's finding that

> "the additional controlling works at the head of the Canal would not seem to involve any burden that could not readily be borne in such navigation." (Master's Report, p. 117.)

The attitude of the Engineer Corps is shown by Gen. Jadwin's statement (Master's Report, p. 109):

> "the Department will consider any application for the approval of plans of controlling works, to be constructed by the Sanitary District or other agency, and may be expected to approve these plans if the works are shown to be necessary, to be effective, and to be the minimum detriment to navigation."

The Master has found that the controlling works will not materially interfere with navigation. The Chief of Engineers has stated that it may be expected that plans therefor will be approved by the Engineer Corps if the works are built so as to cause the minimum detriment to navigation. The decree recommended by the Master requires the Sanitary District to immediately submit plans and construct the works within two years after the plans are approved. Therefore, it can hardly be said that the plans for such works will not be approved and that they will not be installed within the 2 year period required. In view of these circumstances, complainants' exceptions to the Master's Report on this proposition should not be given any consideration.

VIII.

THE AMOUNTS OF THE DIVERSION AT VARIOUS TIMES DURING THE PERIOD OF CONSTRUCTION AS THE DIFFERENT IMPORTANT UNITS OF THE SEWAGE DISPOSAL CONSTRUCTION PROGRAM GO INTO OPERATION, AND THE AMOUNT OF DIVERSION AT THE END OF THE PERIOD OF CONSTRUCTION AFTER ALL THE WORKS ARE COMPLETED, SHOULD BE FIXED BY THE SECRETARY OF WAR, ON THE RECOMMENDATION OF THE CHIEF OF ENGINEERS.

(a) THE OPINION OF JANUARY 14, 1929, HEREIN, INTENDS THAT THE SECRETARY OF WAR, ON THE RECOMMENDATION OF THE CHIEF OF ENGINEERS, SHALL CONTINUE THE EXERCISE OF THE FUNCTIONS HERETOFORE EXERCISED IN FIXING THE AMOUNTS OF THE DIVERSIONS IN THE INTERESTS OF NAVIGATION AND ITS PROTECTION AS THE EXIGENCIES OF THE SITUATION MAY PROMPT.

The Court said in its opinion (Appendix, p. 16):

"Then pending the suit, the Sanitary District disobeyed the restriction of the Secretary of War's per-

mit and increased the diversion to 8,500 cubic feet in order to dispose of the sewage of that District."

* * * * *

(P. 17) "Merely to aid the District in disposing of its sewage was not a justification, considering the limited scope of the Secretary's authority."

* * * * *

(P. 17) "our decree should be so framed as to accord to the Sanitary District a reasonably practicable time within which to provide some other means of disposing of the sewage, reducing the diversion as the artificial disposition of the sewage increases from time to time until it (sewage) is entirely disposed of thereby, when there shall be a final, permanent, operative and effective injunction."

* * * * *

(P. 19) "And in so far as the prior diversion was not for the purposes of maintaining navigation in the Chicago River it was without any legal basis, because made for an inadmissible purpose."

The Court upheld the permit of March 3, 1925, because the diversion under the then present conditions of artificial disposition of the sewage by the Sanitary District was required to protect navigation, but the Court further held that the continuance of the large diversion under permit of the Secretary of War was not justified when it was practicable to construct sewage disposal plants which when operated would not require so much water from Lake Michigan. The condition imposed by the permit the Court considered to be practicable and reasonable, namely, that the Sanitary District should within the period of said permit (from March 3, 1925, to December 31, 1929) carry out a program to be approved by the Engineer Corps for the construction and placing in operatino of artificial sewage disposal plants. It was apparent that the permit of March 3, 1925, was merely one permit in a series of permits that the Secretary of War contemplated issuing to control the diversion in the interest of

navigation, appropriately conditioning the permits to bring about construction and placing in operation by the Sanitary District of sewage disposal works, reducing the diversion "to reasonable limits with utmost dispatch." (Master's Original Report, p. 76).

The Supreme Court, not knowing exactly what future Secretaries of War might do in the way of issuing and conditioning permits, considered that (Appendix, p. 17)

> "In these circumstances we think they (complainants) are entitled to a decree which will be effective in bringing that violation and the unwarranted part of the diversion to an end."

The Court perhaps felt that an injunction compelling the construction and placing in operation of all sewage disposal works practicable, with reasonable speed, would be more effective than conditions of permits issued by the Secretary of War to eliminate that portion of the diversion used to oxidize sewage in lieu of artificial sewage disposal plants. In that connection the following from the Court's opinion, preceding the last quotation, is important (Appendix, p. 16):

> "The normal power of the Secretary of War under Section 10 of the Act of March 3, 1899, is to maintain the navigable capacity of Lake Michigan and not to restrict it or destroy it by diversions. This is what the Secretaries of War and the Chiefs of Engineers were trying to do in the interval between 1896 and 1907 and 1913 when the applications for 10,000 cubic feet a second were denied by the successive Secretaries and in 1908 a suit was brought by the United States to enjoin a flow beyond 4,167 cubic feet a second. *Then pending the suit, the Sanitary District disobeyed the restriction of the Secretary of War's permit and increased the diversion to* 8,500 *cubic feet in order to dispose of the sewage of that District.*
>
> * * * * *
>
> It will be perceived that *the interference* which was the basis of the Secretary's permit, and which

the latter was intended to eliminate, *resulted directly from the failure of the Drainage District to take care of its sewage in some way other than by promoting or continuing the existing diversion.* It may be that some flow from the Lake is necessary to keep up navigation in the Chicago River, which really is part of the Port of Chicago, but that amount is negligible as compared with 8,500 second feet now being diverted. Hence, beyond that negligible quantity, the validity of the Secretary's permit *derives its support entirely from a situation produced by the Sanitary District in violation of the complainants' rights;* and *but for that support complainants might properly press for an immediate shutting down by injunction of the diversion,* save any small part needed to maintain navigation in the river."

In other words, the Supreme Court considered that only the portion of the diversion used for oxidation of sewage when there were means available for artificially purifying it by the construction and operation of sewage disposal plants, was improper and unreasonable and constituted an unreasonable obstruction to navigation, which portion the Secretary of War was not authorized permanently to permit under the 1899 Act "merely to aid the District in disposing of its sewage" (Opin., Appendix, p. 17).

Inasmuch as the record showed that a certain portion of the diversion could be eliminated by the construction of sewage disposal plants, then that portion of the diversion constituted an unreasonable obstruction to navigation, or, rather, it would be an unreasonable obstruction to navigation after a reasonable time had elapsed within which the Sanitary District might construct and put in operation, practicable sewage disposal plants to dispose of Sanitary District sewage. That portion of the diversion thereafter required in the judgment of the Secretary of War to protect navigation would not constitute an unreasonable obstruction to navigation, and

the Secretary could properly by permit authorize such diversion.

The Supreme Court said in its opinion (Appendix, p. 13):

> "The true intent of the Act of Congress was that unreasonable obstructions to navigation and navigable capacity were to be prohibited, and in the cases described in the second and third clauses of Section 10, the Secretary of War, acting on the recommendation of the Chief of Engineers, was authorized to determine what in the particular cases constituted an unreasonable obstruction."

Therefore, if the Secretary of War authorizes a diversion to protect navigation from nuisances or from other impediments caused by the effluents from sewage disposal works and from the sewage in the storm water overflows, when such effluent is discharged to the DesPlaines River through the Sanitary District channels and works, and if the amount fixed is a reasonable amount, then the diversion will be a valid and proper one. The functioning of the Chief of Engineers and the Secretary of War under Section 10 of the Rivers and Harbors Act of 1899 is not, by the Supreme Court's opinion, displaced. Their power in this respect is clearly sustained by the opinion. The permit of March 3, 1925, was held valid. The conditions of the permit were likewise held to be proper and reasonable, which conditions were intended to bring about the substitution of "some other means of disposal" of the sewage. Consequently,

> "This situation gave rise to an exigency which the Secretary, in the interest of navigation and its protection, met by issuing a temporary permit intended to sanction for the time being a sufficient diversion to avoid interference with navigation in the Port of Chicago." (Opinion, pp. 16, 17).

The Court has merely taken into its own hands the bringing about of the construction and placing in opera-

tion of sewage disposal works practicable to dispose of Chicago's sewage. When that is done, there will still remain conditions which the Chief of Engineers and Secretary of War under the 1899 Act will have to meet to protect navigation. The enforcement of the construction and placing in operation of the necessary sewage disposal works is assumed by the Court, of which burden the Chief of Engineers and Secretary of War is relieved.

That the Secretary of War may permit under the 1899 Act a diversion from the Great Lakes watershed to the Mississippi River provided he acts reasonably, is clearly indicated by the Court's opinion. In speaking of the practice of the Chief of Engineers and the Secretary of War under the 1899 Act with reference to the diversion at Chicago, the court said (Appendix, p. 13):

> "The practice is shown by the opinion of the Acting Attorney General, transmitted to the Secretary of War, 34 Opin. Atty. Gen. 410, 416. The Secretary of War acted on this view on May 8, 1899, about two months after the passage of the Act. This was followed by the permits subsequently granted down to March 3, 1925. * * *
>
> But it is said the construction thus favored would constitute it a delegation by Congress of legislative power and invalid. We do not think so. * * *
>
> The construction of Section 10 of the Act of March 3, 1899, was settled by this Court in the decision of the first Chicago Drainage Canal case in 266 U. S. 405, 429. The decision there reached and the decree entered cannot be sustained, except on the theory that the Court decided first that Congress had exercised the power to prevent injury to the navigability of Lake Michigan and the other lakes and rivers in the Great Lakes watershed, and second *that it could properly and validly confer the administrative function of passing on the issue of unlawful injury or otherwise on the Secretary of War, and that it had done so.* To give any other interpretation would necessarily be at variance with our previous decision."

So, after discussing the various grounds for upholding the authority of the Secretary of War to grant a permit and the conditions confronting the Secretary of War on March 3, 1925, the Court sums up its conclusions with reference to this permit in the following language (Appendix, p. 17):

> "He could not make mere local sanitation a basis for a continuing diversion. Accordingly he made the permit of March 3, 1925, both temporary and conditional—temporary in that it was limited in duration and revocable at will, and conditional in that it was made to depend on the adoption and carrying out by the District of other plans for disposing of the sewage."

When the Sanitary District has gone forward and constructed and placed in operation all sewage disposal plants practicable for the elimination or for the treatment of sewage, then Chicago has in that respect taken care of its "local sanitation." Any diversion required in the judgment of the Secretary of War to protect navigation due to effluent from these works and storm overflow, will not be in the interest of "local sanitation," and "local sanitation" would not be "a basis for" continuing that portion of the diversion, but on the contrary the basis would be solely and only protection of navigation. There would be no unreasonable amount diverted. A permit to the Sanitary District authorizing such an amount of diversion would be "lawful." (Opinion, Appendix, p. 14).

(b) THE COURT OUGHT NOT TO TAKE ANY ACTION IN FIXING THE AMOUNT OF THE DIVERSION WHICH WILL INVADE THE SPHERE OF ACTION OF THE POLITICAL DEPARTMENT. THE COURT'S OPINION, OF JANUARY 14, 1929, MUST NOT BE SO CONSTRUED AND, IF IT MAY BEAR SUCH CONSTRUCTION, IT SHOULD BE MODIFIED.

The Court is appropriately and amply equipped to determine what sewage disposal works should be installed to dispose of the sewage and waste of the Sanitary District from a practicable standpoint and the time within which they may be constructed and to enforce by injunctions the installation of such works. The War Department, with its Engineer Corps, is appropriately and amply equipped to determine what diversion may be required to remove objectionable conditions to navigation when these different works are installed. The judgment and decree of the Court, within the sphere above mentioned, will not encroach upon the functions and duties of the Secretary of War on the recommendation of the Chief of Engineers. But if the Court determines what the diversion shall be from time to time in the interest of navigation and its protection, then it will attempt to exercise a judgment and discretion committed to the Secretary of War and Chief of Engineers under Section 10 of the 1899 Rivers and Harbors Act. The Court, referring to the exigency which confronted the Secretary of War and Chief of Engineers when the permit issued March 3, 1925, said (Appendix, p. 16):

> "Had an injunction then issued and been enforced, the Port of Chicago almost immediately would have become practically unusable because of the deposit of sewage without a sufficient flow of water through the Canal to dilute the sewage and carry it away. In the nature of things it was not practicable to stop the deposit without substituting some other means of disposal. This situation gave rise to an exigency

> which the Secretary, in the interest of navigation and its protection, met by issuing a temporary permit intended to sanction for the time being a sufficient diversion to avoid interference with navigation in the Port of Chicago."

As the different sewage disposal works go into operation, and before they are all installed, the amount of pollution of the navigable waters will be correspondingly reduced, but there will still remain an exigency for the Secretary of War to meet. The only difference between the exigency which will then exist and the one which existed on March 3, 1925, is one of degree. There will be the same exigency. In what condition the Secretary may desire the navigable waters to be, in relation to the avoidance of nuisance by the diversion of water, is in the judgment of the Secretary of War. The Court ought not to substitute its judgment for that of the Secretary of War in a matter committed to the Secretary by Congress under the commerce clause of the Constitution. The same situation will exist as more works are put in operation. The degree of the exigency will be different. When all the sewage disposal works are in operation, there will still be an exigency, but it will have been reduced to the minimum. The degree of the exigency will be the smallest practicable, but in any event the judgment of the Secretary of War, in determining the amount of the diversion in the interest of navigation and its protection, must still be exercised.

In

Sanitary District v. *United States,* 266 U. S. 405,

the Sanitary District sought, by appeal to this court, to have set aside the injunction against diverting more than 4167 c.f.s., (the amount of the then existing permit), from Lake Michigan. It urged that a court of equity should temper the relief given by allowing time to the

Sanitary District to build sewage disposal works, on the ground that the enforcement of the injunction immediately would cause not only injury to navigation from a nuisance standpoint in the port and harbor of Chicago, but also pollution of and serious interference with the domestic water supply, endangering the health and lives of the people of Chicago. The Court concluded it was not at liberty to consider this situation in view of the action of the Secretary of War, pursuant to the Act of Congress under the paramount commerce power. The Court said (p. 432):

> "Probably the dangers to which the City of Chicago will be subjected if the decree is carried out are exaggerated, but in any event we are not at liberty to consider them here as against the edict of a paramount power. The decree for an injunction as prayed is affirmed, to go into effect in sixty days—without prejudice to any permit that may be issued by the Secretary of War according to law."

In this controversy the Court dealt with substantially the same situation and exigency, in the following language (Opinion January 14, 1929—Appendix, p. 17):

> "But in keeping with the principles on which courts of equity condition their relief, and by way of avoiding any unnecessary hazard to the health of the people of that section, our decree should be so framed as to accord to the Sanitary District a reasonably practicable time within which to provide some other means of disposing of the sewage, reducing the diversion as the artificial disposition of the sewage increases from time to time, until it is entirely disposed of thereby, when there shall be a final, permanent, operative and effective injunction."

The Court also said (Appendix, p. 19):

> "It therefore is the duty of this Court by an appropriate decree to compel the reduction of the diversion to a point where it rests on a legal basis and thus to restore the navigable capacity of Lake Michigan to its proper level."

The amount of the diversion in the interest of navigation and its protection, was recognized in

Sanitary District v. *United States,* 266 U. S. 405,

to be lodged in the Secretary of War to determine. The opinion of the Court in this case (January 14, 1929) and all language thereof must be interpreted in connection with the well-known canons of construction, that general expressions in the opinion must be restricted to the particular issue in hand; that it must never be assumed that the Court intended to break with the current of authority unless its intention to do so is expressed by clear and unmistakable language; and that any general expressions in an opinion must always be regarded as qualified by the inevitable limitations upon judicial power and the fine respect that one branch of the Government owes to another. There must therefore be read into the above quoted language of the Court's opinion in this case (January 14, 1929) words to the effect that the reduction of the diversion and the amounts of the diversion should be subject to any action taken by the Secretary of War according to law. In other words, the Court would proceed then within the sphere of its constitutional power and the Secretary of War, representing the political department, would proceed with reference to the subject matter within the sphere of his authority from Congress under the paramount commerce clause.

The Secretary of War under the said Act of Congress, will always be concerned with the amount of the diversion in the interest of navigation and its protection. So any decree of the Court must be subject to such action as the Secretary of War may take.

The Court here is acting under Article III of the Constitution, which defines the judicial power, while the Secretary of War is acting under Articles I and II of the

Constitution, which define the political and executive power.

The language of the Court in

Pacific Telephone Company v. *Oregon*, 223 U. S. 118, 142,

is apt.

> "Do the provisions of Section 4, Art. IV, bring about these strange, far-reaching and injurious results? That is to say, do the provisions of that Article obliterate the division between judicial authority and legislative power upon which the Constitution rests? In other words, do they authorize the judiciary to substitute its judgment as to a matter purely political for the judgment of Congress on a subject committed to it and thus overthrow the Constitution upon the ground that thereby the guarantee to the States of a government republican in form may be secured, a conception which after all rests upon the assumption that the States are to be guaranteed a government republican in form by destroying the very existence of a government republican in form in the Nation."

The inquiry necessarily follows, is the Court to substitute its judgment as to the requirements of navigation in navigable waters of the United States, for the judgment of the Secretary of War exercising his authority under the paramount commerce power of Congress? The fixing of the amount of the diversion, in the interest of navigation and its protection, is not a judicial act. It is the determination for the future of the condition in which the navigable waters shall be maintained in the interest of navigation and the determination of what may or may not be obstructions to navigation. It is in the nature of the fixing of a rate or the fixing of the conditions for the operation of a public utility in interstate commerce.

The Court, in

Prentis v. *Atlantic Coast Line*, 211 U. S. 210, 226,

said:

> "A judicial inquiry investigates, declares and enforces liabilities as they stand on present or past facts and under laws supposed already to exist. That is its purpose and end. Legislation on the other hand looks to the future and changes existing conditions by making a new rule to be applied thereafter to all or some part of those subject to its power. The establishment of a rate is the making of a rule for the future, and therefore is an act legislative not judicial in kind * * *."

So, here, the fixing of the amount of the diversion, during the period of the construction and at the end of the period, is the fixing of the rule for the future for the conduct of or condition in which the navigable waters involved shall exist.

(c) IT IS IMPRACTICABLE NOW TO FIX THE AMOUNT OF THE DIVERSION DURING THE CONSTRUCTION PERIOD AND AT THE END OF THE PERIOD. THE PRACTICAL SOLUTION WITH DUE REGARD TO THE STATUTORY FUNCTIONS OF THE SECRETARY OF WAR ON THE RECOMMENDATION OF THE CHIEF OF ENGINEERS, AND TO THE USUAL JUDICIAL POWERS OF THIS COURT, IS TO PROVIDE BY THE DECREE THAT THE DIVERSION SHALL BE, DURING SAID CONSTRUCTION PERIOD AND AT THE END OF SAID CONSTRUCTION PERIOD, SUCH AMOUNTS AS MAY BE DETERMINED BY THE PERMIT OR PERMITS, (ISSUED ACCORDING TO LAW), OF THE SECRETARY OF WAR ON THE RECOMMENDATION OF THE CHIEF OF ENGINEERS; BUT THAT SUCH PERMITS SHALL BE SUBJECT TO REVIEW BY THIS COURT ON THE EVIDENCE ALREADY SUBMITTED AND ANY FURTHER EVIDENCE THAT MAY THEN BE PRESENTED.

Mr. Eddy, defendants' witness, said (Joint Abst., 85):

> "It is my judgment that it would be better to

fix the amount of reduction after these different works are put in and there has been an opportunity to observe the effect of the operation.

I have made the best estimate that I can; but there are so many undetermined and undeterminable factors in the problem that I think it would be wise, if practicable, to allow them to be determined after the works are in operation."

Defendants' witness Pearse said (Joint Abst., 69):

"I hesitate to express a definite opinion as to the exact reductions that can be made in the diversions of water from Lake Michigan during the period of construction because of the size of the problem and the unknown features concerning the effect on the waterways of the residual suspended matter that may come from the plants in the 15 per cent purification that cannot be reached; the overflows from the sewers and oil and other matter that may reach the river from different sources. I believe such reductions should be predicated upon the work as accomplished when the treatment works are completed and put into operation, and that a period of observation and definite reduction can then be determined."

* * * * *

(Joint Abst., 70) "In the operation of the works, while data are available to tell what the probable effect will be of this sewage reaching it, the question will come in the result of the effluent on the waterways of the District and the setting forth of the residual flows that must be allowed to take care of those effluents. That will differ in actual accomplishment, in winter and in summer, according to the condition of the seasons, each year, and will differ in the plants to some extent themselves. And it will differ with the number of storms each year."

See Dr. Mohlman's testimony (*Supra*, 92).

The Court should retain jurisdiction in accordance with the Master's recommendation in his form of decree of the entire matter until all the sewage disposal works are put in operation. Probably one objection which the complainants have to our suggestion that the amounts of the

diversion should be determined by the Secretary of War on the recommendation of the Chief of Engineers, is that, if the Secretary of War should by permit fix the diversion either during the period of construction or at the end of the period of construction, at an amount or amounts which the complainants deem to be arbitrary, then complainants, as they fear, would be compelled to institute a new suit or suits to question the validity of the permit or permits. To obviate this objection, it would seem to be appropriate that the jurisdiction retained should extend to the review by the Court of any permits that may be issued by the Secretary of War according to law in the interest of navigation and its protection, by proper petition or petitions filed by complainants. Thereby, it would be unnecessary to offer evidence already presented in this record which might be material or relevant to the determination of such petition or petitions. In that way there will be utilized the instruments of government, (Secretary of War and Chief of Engineers), legally and practically competent and qualified to determine from time to time exactly what the diversions should be in the interest of navigation and its protection. The Engineer Corps is composed of engineers peculiarly versed and experienced in the solution of the problems that will be presented in determining the amounts of the diversions from time to time. It is accustomed to exercise judgment as to the requirements of navigation upon navigable waters. The War Department's judgment is the judgment which Congress has intended should be exercised. Congress has provided the War Department with the means to make investigations to ascertain the facts and circumstances required to properly exercise such judgment. This solution will permit the two branches of government to work in co-ordination and in harmony to solve the problem of

the installation of the proper works to dispose of the sewage and wastes of the Sanitary District with due and proper speed and the reduction of the diversion from time to time to the amounts that may appropriately be permitted in view of the elimination of the sewage and wastes by the operation of such sewage disposal and other works.

IX.

THE TIME FIXED BY THE MASTER'S REPORT FOR THE INSTALLATION OF ALL THE DIFFERENT WORKS, IS TOO SHORT.

(a) THE RISE IN LAKE LEVELS SINCE THE INTRODUCTION OF THE EVIDENCE ON WHICH THE COURT'S OPINION (JANUARY 14, 1929) WAS RENDERED, SHOULD HAVE CAUSED THE MASTER TO DISREGARD HIS CONCLUSION THAT THE COURT BY ITS SAID OPINION INTENDED TO IMPOSE "AN IMMEDIATELY HEAVY BURDEN" IN THE INSTALLATION OF SAID WORKS. CONSEQUENTLY, THE REASONABLE TIME FOR COMPLETION SHOULD HAVE BEEN ALLOWED. THE SHORTER TIME WHICH WOULD IMPOSE SUCH IMMEDIATELY HEAVY BURDEN IS INEQUITABLE UNDER THE CIRCUMSTANCES.

See for reasons in support of the above proposition, *supra*, 7-9.

(b) LIBERAL ALLOWANCE FOR UNFORESEEABLE DELAYS, IN THE CONSTRUCTION OF SUCH VAST AND UNUSUAL WORKS, SHOULD HAVE BEEN MADE WHICH WOULD HAVE EXTENDED THE CONSTRUCTION PERIOD BEYOND THE DATE (DECEMBER 31, 1938) FIXED BY THE MASTER.

See for reasons in support of the above proposition, *supra*, 9, 10.

X.

IT IS INAPPROPRIATE AT THIS TIME TO DETERMINE WHICH ONE OF THE PARTIES SHALL PAY THE COSTS.

Complainants except to the following in the Master's Report (p. 145):

"No recommendation is made as to costs."

The complainants contend by their exceptions that the costs should be borne by the defendants. It is our position that the determination, of who shall pay the costs, should not be made until the decree upon the exceptions to the Master's Report on Re-reference is entered. At that time the matter may be more appropriately argued and determined.

If complainants base their contention that the defendants should pay the costs upon the theory that the losing party should pay them, then their position is without foundation. So far, it cannot be said that defendants are the losing parties. The bills of complaint attacked the validity of the March 3, 1925, permit, but the Court in its January 14, 1929, opinion held such permit to be valid. In other words, upon the hearing on the original reference it was the position of the defendants that the permit of March 3, 1925, was a complete defense to the complainants' bills; that it was a valid permit and that the diversion could not be reduced during the period of that permit which ended on December 31, 1929.

The Master's Original Report, filed March 23, 1927, upon which the Court's opinion, of January 14, 1929, was rendered, recommended the dismissal of the complainants' bills, without prejudice, on the ground that the permit of March 3, 1925, was valid. The Court by its opinion (January 14, 1929) sustained the Master (Appendix,

pp. 14-17) and held the permit valid. The said permit of March 3, 1925, contained conditions which required the Sanitary District to install certain sewage disposal works within the period of said permit. It was apparent that the March 3, 1925, permit was one in a series of permits which would be similarly conditioned until practicable works had been installed to dispose of *all* the sewage and wastes of the District, to the greatest practicable extent known in the art, and that the diversion of water would be reduced as the sewage and wastes were eliminated by the installation of such works to the amount or amounts that the interests of navigation and its protection would permit. With such conditions and reductions of diversions as the Secretary of War might provide, the defendants agreed. The Court by its opinion of January 14, 1929, while sustaining the then existing permit, directed an inquiry by the Special Master with reference to the practical measures required to dispose of the sewage and wastes of the Sanitary District, and indicated that likewise there should be accomplished reduction in diversion as such wastes were eliminated by the operation of the sewage disposal works to be installed. In the one case the Secretary of War would determine the works to be installed, and in the other case the Court would determine what works should be constructed and put in operation to dispose of the sewage and wastes from a practicable standpoint. In the one case the Secretary of War would determine the amount of the reductions or the amounts of the diversion from time to time, in addition to the works to be installed and the time therefor, and in the other case, according to the complainants, the Court would determine the amount of the reduction or the amounts of the diversion from time to time, and, according to the defendants, still the Secretary of War would determine the amount of the re-

ductions or the amounts of the diversion from time to time, in addition to determining what sewage disposal works should be constructed and the reasonable time for their construction.

In

North Dakota v. *Minnesota*, 263 U. S. 583, the Court has discussed very extensively the question of who should pay the costs in original suits.

In

Kansas v. *Colorado*, 206 U. S. 46, 117,

and

Wyoming v. *Colorado*, 259 U. S. 496,

where the settlement of the controversy was useful to both sides and involved governmental questions in which each party had a real and vital interest, the Court followed the boundary cases and divided the costs. In the former case the costs were divided equally between the two states. In the latter case one-third was ordered to be paid by Wyoming, one-third by Colorado and one-third by the two corporate defendants at whose expense the case had been defended by Colorado.

In

North Dakota v. *Minnesota*, 263 U. S. 583,

the Court assessed the costs against North Dakota on the ground that the suit had been instituted at the behest of certain alleged injured persons who had raised a fund to conduct the litigation and that, therefore, it was a litigious case.

In order to properly dispose of the question as to the parties who should pay the costs, it may be necessary for the Court to have an inquiry to determine the instigators of this litigation and the persons, firms and corporations

other than the parties named as complainants who have contributed money and services and other things to the carrying on of the litigation through complainants.

We suggest, therefore, that the determination of the party or parties, upon whom the costs shall fall in this litigation, be made after the entry of the final decree herein.

CONCLUSION.

Defendants' exceptions relate principally to conclusions of law in the Master's Report, such as the effect that should be given to the rise in Lake levels since the presentation of the evidence upon which the Court's opinion of January 14, 1929, was based, whether the maintenance of unobjectionable conditions for navigation in the DesPlaines and Illinois Rivers should be considered in fixing the amount of diversion, and whether the amounts of the diversion from time to time during the period of construction and at the end of the period should be fixed by the Secretary of War on the recommendation of the Chief of Engineers.

Complainants' exceptions to a great extent relate to conclusions of fact such as the practicability of the installation of filter plants for water supply, of the extension of intake tunnels, of building of super tunnels and a separate sewer system, of the chlorination of effluent, of the construction of outfall sewers and of providing circulating water devices for the Chicago River and its auxiliary channels; whether pollution of navigable waters caused by the introduction of sewage has relation to the interest of navigation; and the effect upon navigable waters and navigation of the discharge of sewage and wastes of Chicago into Lake Michigan, and similar questions.

The determination of the questions of fact

> "depends upon conflicting testimony or upon the credibility of witnesses"

and the Master heard the testimony and observed the witnesses, and his findings

> "must be treated as unassailable." *Davis* v. *Schwartz*, 155 U. S. 631, 636.

The Master also viewed the operation of an activated sludge plant (the North Side Sewage Treatment plant of the Sanitary District) and saw the sludge and effluent derived from such plant in operation, which circumstance lends greater weight to the Master's conclusions of fact.

Respectfully submitted,

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STATEMENT ON BEHALF OF THE STATES OF MISSOURI, KENTUCKY, TENNESSEE, LOUISIANA, MISSISSIPPI AND ARKANSAS, INTERVENING DEFENDANTS.

The intervening defendant States, known in this case as the Mississippi Valley States, have not conceived that any of the issues concerning which the court directed a re-reference to the Special Master, involve the interest or rights of these intervening defendants. The Mississippi Valley States, however, desire to join with the State of Illinois and the Sanitary District in urging the contentions in this brief concerning the power of the Secretary of War and the propriety and necessity of avoiding, by the terms of the decree to be entered herein, any interference with the future exercise of that power.

Respectfully submitted,

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APPENDIX.

SUPREME COURT OF THE UNITED STATES.

Nos. 7, 11, and 12 Original.—OCTOBER TERM, 1928.

State of Wisconsin, State of Minnesota, State of Ohio, and State of Pennsylvania, Complainants, 7 *vs.* State of Illinois and Sanitary District of Chicago, Defendants. State of Missouri, State of Kentucky, State of Tennessee, State of Louisiana, State of Mississippi, and State of Arkansas, Intervening Defendants.	No. 7, Original.
State of Michigan, Complainant, 11 *vs.* State of Illinois and Sanitary District of Chicago, Defendants.	No. 11, Original.
State of New York, Complainant, 12 *vs.* State of Illinois and Sanitary District of Chicago, Defendants.	No. 12, Original.

[January 14, 1929.]

Mr. Chief Justice TAFT delivered the opinion of the Court.

These are amended bills by the States of Wisconsin, Minnesota, Michigan, Ohio, Pennsylvania and New York, praying for an injunction against the State of Illinois and the Sanitary District of Chicago from continuing to withdraw 8,500 cubic feet of water a second from Lake Michigan at Chicago.

The Court referred the cause to Charles Evans Hughes as a Special Master, with authority to take the evidence, and to report the same to the Court with his findings of fact, conclusions of law and recommendations for a decree, all to be subject to ap-

proval or other disposal by the Court. The Master gave full hearings and filed and submitted his report November 23, 1927, to which the complainants duly lodged exceptions, which have been elaborately argued.

When these bills were filed, there was pending in this Court an appeal by the Sanitary District of Chicago from a decree granted at the suit of the United States by the United States District Court for the Northern District of Illinois, against a diversion from the Lake in excess of 250,000 cubic feet per minute, or 4,167 cubic feet per second. This amount had been permitted by the Secretary of War. In January, 1925, this Court affirmed the decree, without prejudice to the granting of a further permit by the Secretary of War according to law. 266 U. S. 405. On March 3, 1925, the Secretary of War after that decree enlarged the permit for a diversion not to exceed an annual average of 8,500 cubic feet per second, upon certain conditions hereafter to be noted.

The amended bills herein averred that the Chicago diversion had lowered the levels of Lakes Michigan, Huron, Erie and Ontario, their connecting waterways, and of the St. Lawrence River above tide-water, not less than six inches, to the serious injury of the complainant States, their citizens and property owners; that the acts of the defendants had never been authorized by Congress but were violations of the rights of the complainant States and their people; that the withdrawals of the water from Lake Michigan were for the purpose of taking care of the sewage of Chicago and were not justified by any control Congress had attempted to exercise or could exercise in interstate commerce over the waters of Lake Michigan; and that the withdrawals were in palpable violation of the Act of Congress of March 3, 1899. The bills prayed that the defendants be enjoined from permanently diverting water from Lake Michigan or from dumping or draining sewage into its waterways which would render them unsanitary or obstruct the people of the complainant States in navigating them.

The State of Illinois filed a demurrer to the bills and the Sanitary District of Chicago an answer, which included a motion to dismiss. The States of Missouri, Kentucky, Tennessee and Louisiana, by leave of Court, became intervening co-defendants, on the same side as Illinois, and moved to dismiss the bills. The demurrer

of Illinois was overruled and the motions to dismiss were denied, without prejudice. Thereupon the intervening defendants and the defendants, the Sanitary District and the State of Illinois, filed their respective answers. The States of Mississippi and Arkansas were also permitted to intervene as defendants, and adopted the answers of the other interveners. The answers of the defendants denied the injuries alleged, and averred that authority was given for the diversion under the acts of the Legislature of Illinois and under acts of Congress and permits of the Secretary of War authorized by Congress in the regulation of interstate commerce. All the answers stressed the point that the diversion of water from Lake Michigan improved the navigation of the Mississippi Valley and was an aid to the commerce of the Mississippi Valley and sought the preservation of this aid. They also set up the defense of laches, acquiescence and estoppel, on the ground that the purposes of the canal and the diversion were known to the people and the officials of the complainant States, and that no protest or complaint had been made in their behalf prior to the filing of the original bills herein.

The Master has made a comprehensive review of the evidence before him in regard to the history of the canal, the extent and effect of the diversion, the action of the State and Federal Governments, the plans for the disposal of the sewage and waste of Chicago and the other territory within the Sanitary District, as well as the character and feasibility of works proposed as a means of compensating for the lowering of lake levels. From this review we shall take what will assist us in the consideration of the issues deemed necessary to be considered on the exceptions to the report.

We shall first consider in brief the parts taken by Congress and the State of Illinois and their respective agencies in the construction of the Sanitary District Canal and the creation of the Lake Michigan diversion.

By the Act of March 30, 1822, c. 14; 3 Stat. 659, Congress authorized Illinois to survey and mark, through the public lands of the United States, the route of a canal connecting the Illinois River with Lake Michigan, and granted certain lands in aid of the project. A further land grant was made in 1827. The canal was completed in 1848. The canal crossed the continental divide between the Chicago and Des Plaines Rivers, on a summit level eight feet above the Lake,

and then paralleled the Des Plaines River and the Upper Illinois River to La Salle, Illinois, where it entered the latter stream. The summit of the canal was supplied with water by pumps located in a plant on the Chicago River. Originally, only enough water was pumped to answer the needs of navigation in the canal, but thereafter, in 1861, the Legislature provided for improvement in the canal by excavation and a larger flow of water from Lake Michigan.

Before 1865, the Chicago River, being a sluggish stream in its lower reaches, had become so offensive because of receiving the sewage of the rapidly growing city, that for its immediate relief the municipal authorities and the canal commissioners agreed to pump water from the river in excess of the needs of navigation. By 1872 the summit level of the canal had been lowered, and it was hoped that this would result in a permanent flow of lake water through the South Branch of the Chicago River, sufficient to keep it in good condition, but the plan failed, and the canal again became grossly polluted.

In 1881, the Illinois Legislature passed a resolution authorizing the installation of pumps at the northern terminus of the canal, with a capacity of not less than 1,000 cubic feet a second, to draw water from Lake Michigan through the Chicago River and the canal. Pumps were installed and pumping was begun in 1883. For a few years this afforded sufficient dilution in the canal because of the high stage of Lake Michigan, but in 1886 the lake level began to fall, and continued to fall until 1891 when it was two feet lower than when the pumps were installed. Their capacity was thus reduced to a little more than 600 cubic feet a second. The nuisance along the canal continued to grow. The Drainage and Water Supply Commission of the State recommended, as the most economical method for meeting the requirement, a discharge into the Des Plaines River through a canal across the continental divide, providing a waterway of such dimensions as would furnish ample dilution. The Commission pointed out that the proposed canal would, from its necessary dimensions and its regular discharge, produce a magnificent waterway between Chicago and the Mississippi River, suitable for navigation of boats having as much as 2,000 tons burden, and would give also large water power of great commercial value to the State.

The Sanitary District was organized under the Illinois Act of 1889. It was completed in 1890. It embraced an area of 185 square miles. By later acts it was increased to approximately 438 square miles, extending from the Illinois State line on the south and east to the northern boundary of Cook County on the north, with about 34 miles of frontage on Lake Michigan, embracing the metropolitan area of Chicago, consisting of a total of fifty-four cities, towns and villages.

The main drainage canal was begun in 1892, and was opened in January, 1900. Since that time the flow of the Chicago River has been reversed—that is, it has been made to flow away from Lake Michigan toward the Mississippi. As originally constructed the canal ended in a non-navigable tail-race. There was no lock at the southwestern end. But by the Act of May 14, 1903, the Illinois Legislature gave the Sanitary District the power to construct dams, water wheels, and other works appropriate to render available the power arising from the water passing through the main channel and any auxiliary channels thereafter constructed.

In 1908, the Constitution of Illinois was amended to authorize the legislature to provide for the construction of a deep waterway or canal, from the water-power plant of the Sanitary District of Chicago, at or near Lockport, to a point on the Illinois River at or near Utica, and to provide that this power might be leased for the benefit of the State treasury. Meantime, all the sewage in the drainage district, including Evanston, was turned into the main channel, and the water directly abstracted from Lake Michigan by the Sanitary District was increased from 2,541 cubic feet a second in 1900 to 5,751 in 1909, to 7,228 in 1916, to 6,888 cubic feet a second in 1926, not including pumpage.

The Sanitary District authorities have expended in the construction of works for sewage and the deep waterway canal $109,021,613 including interest on bonds.

In 1888, Congress directed the Secretary of War to make surveys for a channel improvement in the Illinois and Des Plaines Rivers. In 1892, Congress appropriated $72,000 to complete the improvement of the harbor at Chicago, and again $25,000 in 1894. Three engineers appointed by the Secretary of War reported to him that a diversion of 10,000 cubic feet a second through the Sanitary

and Ship Canal would lower the levels of the Lakes, except Lake Superior. In 1896, Congress appropriated money for dredging the Chicago River. The Sanitary District in that year asked for a permit from the Secretary of War to enlarge the cross section of the Chicago River, and announced that the work had progressed so far that this must be done to make available the artificial channel under construction from Robey Street, Chicago, to Lockport, twenty-eight miles distant. The Secretary of War granted the permit, but said that this authority was not to be interpreted as an approval of the plans of the Sanitary District of Chicago to introduce a current into the Chicago River; that the United States should not be put to any expense, and that the authority was to expire by limitation in two years. Other permits relating to the same subject were issued by the same officer in 1897, 1898, and twice in 1899. The Act of Congress of 1899 amplified the provisions of an earlier Act of 1890 looking to the regulation, prevention, and removal by Federal authority of obstructions to navigation and alteration of capacity of the navigable waters of the United States by enacting Sections 9 and 10 thereof.

Other permits were allowed by the Secretary of War—one on December 5, 1901 allowing a diversion of 250,000 cubic feet per minute throughout the full 24 hours of each day. And in another instance on January 17, 1903, a diversion of 350,000 cubic feet per minute until March 31, 1903, was permitted, in order to carry off the accumulations of sewage deposit lining the shores along the city, with the provision that after that, the flow should be reduced to 250,000 cubic feet per minute as required by the permit of December, 1901. The Board of Engineers in 1905 reported to Congress that the effect upon the level of Lake Michigan of withdrawing 10,000 cubic feet per second for an indefinite period had been the subject of elaborate investigation and that the conclusion reached was that the final effect would be to lower the level of the Lake six inches.

An application for the flow of more water through the Calumet Sag Channel was declined by the Chief of Engineers, and was refused by the Secretary of War in March, 1907, and as the Sanitary District apparently intended to proceed with the work for which a permit had been refused, the United States brought suit in 1908

to prevent its construction and prevent the increase of the flow. Another application was refused by the Secretary of War in January, 1913, and there seems to have been another denied later.

A second bill to enjoin the Sanitary District from a diversion of more than 250,000 cubic feet per minute or its equivalent 4,167 cubic feet a second of water from Lake Michigan was filed and was consolidated with the earlier suit, and after a long delay of six or seven years an oral opinion was given by Judge Landis of the United States District Court for the Northern District of Illinois in favor of the Government. A decree not having been entered before Judge Landis resigned, a decree was entered by Judge Carpenter in the case which was affirmed by this Court in January, 1925. *Sanitary District of Chicago* v. *United States,* 266 U. S. 405.

This Court's decree provided that the defendant, the Sanitary District of Chicago, its agents, and all other persons acting or claiming or assuming to act under its authority, should be enjoined from diverting or abstracting any waters from Lake Michigan over and above or in excess of 250,000 cubic feet per minute, to go into effect in sixty days, without prejudice to any permit that might be issued by the Secretary of War according to law.

Immediately after this decision, the Sanitary District applied to the Secretary of War for permission to divert 10,000 cubic feet a second. The exigency was set out in the petition. The Secretary of War then issued a permit on March 3, 1925, which cited that the instrument did not give any property rights either in real estate or material, or any exclusive privileges; and that it did not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State or local laws or regulations, or obviate the necessity of obtaining the State's assent to the work authorized. It certified that upon the recommendation of the Chief of Engineers, the Secretary of War, under Section 10 of the Act of 1899, authorized the Sanitary District to divert from Lake Michigan an amount of water not to exceed an annual average of 8,500 cubic feet per second, the instantaneous maximum not to exceed 11,000 cubic feet per second, upon certain conditions.

The conditions of the permit require the City of Chicago to take immediate steps to carry out sewage treatment by artificial

processes, so that before the expiration of the permit they should provide the equivalent of 100% treatment of the sewage of 1,200,000 people, or one-third of the population of the city, and that this should be done under supervision of the U. S. District Engineer at Chicago, the permit to be revoked if the conditions were not complied with, and the permit to cease unless renewed on December 31, 1929. In granting the permit, the Secretary of War expressed the opinion that steps should be taken to complete the entire work of providing for disposal of all the sewage in ten years. Colonel Schultz, U. S. District Engineer at Chicago, reported that the conditions of the March 3, 1925 permit have been complied with, and the Master confirms this in his report.

In providing for the improvement of the channel of the Illinois River in the Act of January 21, 1927, c. 47; 44 Stat. 1013, Congress declared that nothing in the Act should be construed as authority for any diversion from Lake Michigan.

The Master's findings on the subject of injury to the complainants are in effect as follows:

The diversion which has taken place through the Chicago Drainage Canal has been substantially equivalent to a diversion of about 8,500 cubic feet a second for a period of time sufficient to cause, and it has caused, the lowering of the mean levels of the Lakes and the connecting waterways, as follows: Lakes Michigan and Huron approximately 6 inches; Lakes Erie and Ontario approximately 5 inches; and of the connecting rivers, bays and harbors to the same extent respectively. A diversion of an additional 1,500 cubic feet per second, or a total diversion of 10,000 cubic feet a second would cause an additional lowering in Lakes Michigan and Huron of about one inch, and in Lakes Erie and Ontario a little less than one inch, with a corresponding additional lowering in the connecting waterways, The Master also finds that if the diversion at Chicago were ended, assuming that other diversions remained the same, the mean levels of the lakes and rivers affected by the Chicago drainage would be raised in the course of several years (about 5 years in the case of Lakes Michigan and Huron, and about one year in the case of Lakes Erie and Ontario) to the same extent as they had been lowered, respectively, by that diversion.

The Master finds that the damage due to the diversion at Chicago relates to navigation and commercial interests, to structures, to the convenience of summer resorts, to fishing and hunting grounds, to public parks and other enterprises, and to riparian property generally, but does not report that injury to agriculture is established. He says that the Great Lakes and their connecting channels form a natural highway for transportation, having a water surface of over 95,000 square miles, and a shore line of 8,300 miles, extending from Duluth-Superior, and from Chicago and Gary, to Montreal, at the head of deep-draft ocean navigation on the St. Lawrence; that there are approximately 400 harbors on the Great Lakes and connecting channels, of which about 100 have been improved by the Federal Government; that the latter improvements consist in the excavation and maintenance of channels from deep water in the lakes to the harbor entrances; that inner or local harbors are located inside of the Federal channels, and the depths in the inner harbors have been obtained and are maintained at local expense; that inner harbors are necessary to afford practical navigation; that extensive and expensive loading, unloading and other terminal facilities have been constructed in these various ports within the territory of the complainant States, on the Great Lakes, at local expense.

The Master's report says that the water-borne traffic on the Great Lakes for the year 1923 consisted of 81,466,902,000 ton-miles of water haul, and that consideration of individual loaded boats and of their respective dimensions shows that, if water had been available for an additional six inches of draft, the fleet could have handled for the year 3,346,000 tons more than was actually transported, or to put the matter in another light, the season's business could have been done with the elimination from service of about 30 freighters of the 2,000-3,000-ton class, and that the lost tonnage of the total through business of the Lakes for 1923, incident to a 6-inch deficiency of draft, exceeded 4,000,000 tons, and that the average water-haul rate for the year was 88 cents per ton.

The great losses to which the complainant States and their citizens and their property owners have been subjected by the reductions of levels in the various Lakes and Rivers except Lake Superior are made apparent by these figures.

The pleadings question the jurisdiction of this Court and the sufficiency of the facts set forth in the bills to constitute a cause of action. These issues, although raised, are not pressed by the defendants and we concur with the Master in his conclusion that they are met completely by our previous decisions. *Missouri* v. *Illinois,* 180 U. S. 208; s. c. 200 U. S. 496; *Hans* v. *Louisiana,* 134 U. S. 1; *Sanitary District of Chicago* v. *United States,* 266 U. S. 405; *Kansas* v. *Colorado,* 185 U. S. 125; s. c. 206 U. S. 46; *New York* v. *New Jersey,* 256 U. S. 296; *Wyoming* v. *Colorado,* 259 U. S. 419; *North Dakota* v. *Minnesota,* 263 U. S. 365; *Pennsylvania* v. *West Virginia,* 262 U. S. 553, 623; 263 U. S. 350; *Georgia* v. *Tennessee Copper Co.,* 206 U. S. 230, 237.

The controversies have taken a very wide range. The exact issue is whether the State of Illinois and the Sanitary District of Chicago by diverting 8,500 cubic feet from the waters of Lake Michigan have so injured the riparian and other rights of the complainant States bordering the Great Lakes and connecting streams by lowering their levels as to justify an injunction to stop this diversion and thus restore the normal levels. Defendants assert that such a diversion is the result of Congressional action in the regulation of interstate commerce, that the injury, if any, resulting is *damnum absque injuria* to the complaining States. Those States reply that the regulation of interstate commerce under the Constitution does not authorize the transfer by Congress of any of the navigable capacity of the Great Lake System of Waters to the Mississippi basin, that is from one great watershed to another; second, that the transfer is contrary to the provision of the Constitution forbidding the preference of the ports of one State over those of another; and, third, that the injuries to the complainant States deprive them and their citizens and property owners of property without due process of law and of the natural advantages of their position, contrary to their sovereign rights as members of the Union. If one of these issues is decided in favor of the complaining States, it ends the case in their favor and the diversion must be enjoined. But in the view which we take respecting what actually has been done by Congress some of these objections need not be considered or passed upon.

The complainants, even apart from their constitutional objections, contend that Congress has not by statute or otherwise authorized the Lake Michigan diversion, that it is therefore illegal and that injuries by it to the complainant States and their people should be forbidden by decree of this Court. The diversion of 8,500 cubic feet a second is now maintained under a permit of the Secretary of War of March 3, 1925, acting under Section 10 of the Act of 1899, which it is contended by the complainants vests no such authority in him. They claim that the diversion is based on a purpose not to regulate navigation of the Lake, but merely to get rid of the sewage of Chicago, that this is a State purpose, not a Federal function, and should be enjoined to save the rights of complainants. If the view urged by the complainants is right, the necessity for the use of the 8,500 cubic feet a second to save the health of the inhabitants of the Drainage District will then present the problem of the power and discretion of a court of equity to moderate the strict and immediate rights of the parties complainant to a gradual one which will effect justice as rapidly as the situation permits. The framing of the decree will then require the careful consideration of the Court.

The complainants contend that Congress has given no authority for the diversion from Lake Michigan, even if it has power so to do by way of regulating interstate commerce. The defendants rely for this authority on the permit of the Secretary of War issued by him March 3, 1925, to the Sanitary District shortly after the decree of this Court in the *Sanitary District* v. *United States,* 266 U. S. 405. That decree forbade the diversion of the waters from Lake Michigan in excess of 4,167 cubic feet a second, but was made expressly without prejudice to any permit issued by the Secretary of War according to law. The complainants contend that the permit which allows a diversion of 8,500 cubic feet a second is not in regulation of interstate commerce, is not according to law and should be declared invalid.

The defendants base their claim of Congressional authority on Section 10 of the Act of March 3, 1899, c. 425; 30 Stat. 1151—

"That the creation of an obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States, is hereby prohibited; and it shall not be

lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of War, and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor or refuge, or inclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same."

The policy carried out in the Act of March 3, 1899, had been begun in the Act of September 19, 1890, c. 907; 26 Stat. 454, 455. Sections 9 and 10 were the re-arranged result of the provisions of Sections 7 and 10 of the Act of 1890. A new classification was made in Sections 9 and 10 of the Act of 1899, and substituted for Section 10 of the Act of 1890. The latter provided that the creation of any obstruction to navigable capacity was prohibited, unless "affirmatively authorized by law" and this was changed so as to read "affirmatively authorized by Congress." The change in the words of the first clause of Section 10 was intended to make mere State authorization inadequate. *Sanitary District* v. *United States*, 266 U. S. 405, 429; *United States* v. *Bellingham Bay Boom Co.*, 176 U. S. 211. It was not intended to override the authority of the State to put its veto upon the placing of obstructing structures in navigable waters within a State and both State and Federal approval were made necessary in such case. *Cummings* v. *Chicago*, 188 U. S. 410. The words "affirmatively authorized by Congress" should be construed in the light of the administrative exigencies which prompted the delegation of authority in the succeeding clauses. Congress, having stated in Section 9 as to what particular structures its specific consent should be required, intended to leave to the Secretary of War, acting on the recommendation of the Chief of Engineers, the determination of what should be approved and authorized in the classes of cases described in the second and third clauses of Section 10. If the section were construed to require a special authorization by Congress whenever

in any aspect it might be considered that there was an obstruction to navigable capacity, none of the undertakings specifically provided for in the second and third clauses of Section 10 could safely be undertaken without a special authorization of Congress. We do not think this was intended. The Supreme Court of Maine in *Maine Water Co.* v. *Knickerbocker Steam Towage Co.*, 99 Me. 473, took the same general view in construction of the same section. It held that the broad words of the first clause of that section were not intended to limit the second and third clauses and that Congress's purpose was a direct prohibition of what was forbidden by them except when affirmatively approved by the Chief of Engineers and the Secretary of War. We concur in this view.

The true intent of the Act of Congress was that unreasonable obstructions to navigation and navigable capacity were to be prohibited, and in the cases described in the second and third clauses of Section 10, the Secretary of War, acting on the recommendation of the Chief of Engineers, was authorized to determine what in the particular cases constituted an unreasonable obstruction.

This construction of Section 10 is sustained by the uniform practice of the War Department for nearly thirty years. Nothing is more convincing in interpretation of a doubtful or ambiguous statute. *United States* v. *Minnesota*, 270 U. S. 181, 205; *Swendig* v. *Washington Water Power Co.*, 265 U. S. 322, 331; *Kern River Co.* v. *United States*, 257 U. S. 147, 154; *United States* v. *Burlington & Missouri River R. R.*, 98 U. S. 334, 341; *United States* v. *Hammers*, 221 U. S. 220, 228; *Logan* v. *Davis*, 233 U. S. 613, 627.

The practice is shown by the opinion of the Acting Attorney General, transmitted to the Secretary of War, 34 Op. Atty. Gen. 410, 416. The Secretary of War acted on this view on May 8, 1899, about two months after the passage of the Act. This was followed by the permits subsequently granted down to March 3, 1925. The fact that the Secretary of War acted on this view was made known to Congress by many reports.

But it is said the construction thus favored would constitute it a delegation by Congress of legislative power and invalid. We do not think so. The determination of the amount that could be safely taken from the Lake is one that is shown by the evi-

dence to be a peculiarly expert question. It is such a question as this that is naturally within the executive function that can be deputed by Congress. *Southern Pacific Co.* v. *Olympian Dredging Co.*, 260 U. S. 205, 208; *Sanitary District* v. *United States*, 226 U. S. 405, 428; *Field* v. *Clark*, 143 U. S. 649, 693; *Butterfield* v. *Stranahan*, 192 U. S. 470, 496; *Union Bridge Co.* v. *United States*, 204 U. S. 364, 386; *Monongahela Bridge Co.* v. *United States*, 216 U. S. 177, 192; *Louisville Bridge Co.* v. *United States*, 242 U. S. 409, 424; *J. W. Hampton, Jr. & Co.* v. *United States*, 276 U. S. 394, 407.

The construction of Section 10 of the Act of March 3, 1899, was settled by this Court in the decision of the first Chicago Drainage Canal case in 266 U. S. 405, 429. The decision there reached and the decree entered can not be sustained, except on the theory that the Court decided first that Congress had exercised the power to prevent injury to the navigability of Lake Michigan and the other lakes and rivers in the Great Lakes watershed, and second that it could properly and validly confer the administrative function of passing on the issue of unlawful injury or otherwise on the Secretary of War, and that it had done so. To give any other interpretation would necessarily be at variance with our previous decision.

It is further argued by complainants that while the power of Congress extends to the protection and improvement of navigation, it does not extend to its destruction or to the creation of obstructions to navigable capacity. This Court has said that while Congress is the exercise of its power may adopt any means having some positive relation to the control of navigation and not otherwise inconsistent with the Constitution, *United States* v. *Chandler-Dunbar Co.*, 229 U. S. 53, 62, it may not arbitrarily destroy or impair the rights of riparian owners by legislation which has no real or substantial relation to the control of navigation or appropriateness to that end. *United States* v. *River Rouge Improvement Co.*, 269 U. S. 411, 419; *Port of Seattle* v. *Oregon & Washington R. R.*, 255 U. S. 56, 63.

So complainants urge that the diversion here is for purposes of sanitation and development of power only, and therefore that it

lies outside the power confided by Congress to the Secretary of War. The Master says:

"There is no doubt that the diversion is primarily for the purposes of sanitation. Whatever may be said as to the service of the diverted water in relation to a waterway to the Mississippi, or as to the possible benefit of its contribution to the navigation of that river at low water stages, it remains true that the disposition of Chicago's sewage has been the dominant factor in the promotion, maintenance and development of the enterprise by the State of Illinois and the Sanitary District. The purpose of utilizing the flow through the drainage canal to develop power is also undoubtedly present, although subordinated to the exigency of sanitation. So far as the diverted water is used for the development of power, the use is merely incidental. This Court, in *Sanitary District* v. *United States,* 266 U. S. 405, 424, in describing the channel, looked upon its interest to the Sanitary District 'primarily as a means to dispose of the sewage of Chicago,' although it was also 'an object of attention to the United States as opening water communication between the Great Lakes and the Mississippi and the Gulf.' "

The Master then considered whether there was any express authorization of the diversion now permitted, except under Sections 9 and 10 of the Act of March 3, 1899, already referred to. On this subject he said:

"Consideration by Congress of the advisability of the proposed waterway from Lake Michigan to the Illinois and Mississippi Rivers, demands by Congress for surveys, plans and estimates, the establishment of project depths, and appropriations for specified purposes, did not in my opinion constitute direct authority for the diversion in question, however that diversion, or the diversion of some quantity of water from Lake Michigan, might fit into an ultimate plan."

This conclusion of the Master is fully supported by reference to the already cited Rivers and Harbors Appropriation Act of 1927 declaring that nothing therein should authorize any Lake Michigan diversion.

The Master also says that appropriations for widening and deepening the Chicago River, and the cooperation with the Sanitary District for several years in that improvement, merely committed Congress to the work as thus actually prescribed, but did not go

further, whatever the advantages of that work in connection with the purposes of the Sanitary District's Canal.

He then proceeds:

"There is nothing in any of the acts of Congress upon which the defendants rely specifying any particular quantity of water which could be diverted and it could hardly be considered a reasonable contention that the acts of Congress justified any diversion of water from Lake Michigan that the State of Illinois and the Sanitary District might see fit to make. It is manifest that it was the view of the War Department that Congress had not acted directly and whatever the Department did was subject to such action as Congress might take."

He continues:

"This understanding that Congress has not yet acted directly so as to authorize the diversion in question has continued. It was in this view that the United States prosecuted its suit to decree in this Court to enjoin the defendants from taking more water from Lake Michigan than the Secretary of War had allowed."

In this conclusion, which the Court confirms, we are therefore remitted solely to the effect and operation of the permit of 1925 as authority for the maintenance of the diversion.

The normal power of the Secretary of War under Section 10 of the Act of March 3, 1899, is to maintain the navigable capacity of Lake Michigan and not to restrict it or destroy it by diversions. This is what the Secretaries of War and the Chiefs of Engineers were trying to do in the interval between 1896 and 1907 and 1913 when the applications for 10,000 cubic feet a second were denied by the successive Secretaries and in 1908 a suit was brought by the United States to enjoin a flow beyond 4,167 cubic feet a second. Then pending the suit the Sanitary District disobeyed the restriction of the Secretary of War's permit and increased the diversion to 8,500 cubic feet in order to dispose of the sewage of that District. Had an injunction then issued and been enforced, the Port of Chicago almost immediately would have become practically unusable because of the deposit of sewage without a sufficient flow of water through the Canal to dilute the sewage and carry it away. In the nature of things it was not practicable to stop the deposit without substituting some other means of disposal. This situation gave rise to an exigency which the

Secretary, in the interest of navigation and its protection, met by issuing a temporary permit intended to sanction for the time being a sufficient diversion to avoid interference with navigation in the Port of Chicago. See *New York* v. *New Jersey*, 256 U. S. 296, 307, 308. The elimination and prevention of this interference was the sole justification for expanding the prior permit, the limitations of which had been disregarded by the Drainage District. Merely to aid the District in disposing of its sewage was not a justification, considering the limited scope of the Secretary's authority. He could not make mere local sanitation a basis for a continuing diversion. Accordingly he made the permit of March 3, 1925, both temporary and conditional—temporary in that it was limited in duration and revocable at will, and conditional in that it was made to depend on the adoption and carrying out by the District of other plans for disposing of the sewage.

It will be perceived that the interference which was the basis of the Secretary's permit, and which the latter was intended to eliminate, resulted directly from the failure of the Drainage District to take care of its sewage in some way other than by promoting or continuing the existing diversion. It may be that some flow from the Lake is necessary to keep up navigation in the Chicago River, which really is part of the Port of Chicago, but that amount is negligible as compared with 8,500 second feet now being diverted. Hence, beyond that negligible quantity, the validity of the Secretary's permit derives its support entirely from a situation produced by the Sanitary District in violation of the complainants' rights; and but for that support complainants might properly press for an immediate shutting down by injunction of the diversion, save any small part needed to maintain navigation in the river. In these circumstances we think they are entitled to a decree which will be effective in bringing that violation and the unwarranted part of the diversion to an end. But in keeping with the principles on which courts of equity condition their relief, and by way of avoiding any unnecessary hazard to the health of the people of that section, our decree should be so framed as to accord to the Sanitary District a reasonably practicable time within which to provide some other means of disposing of the sewage, reducing the diversion as the artificial disposition of the sewage increases from

time to time, until it is entirely disposed of thereby, when there shall be a final, permanent operative and effective injunction.

It is very apparent from the report of the Master and from the state legislation that the Legislature of Illinois and the Drainage District have for a long period been strongly insistent upon such a use of the waters of Lake Michigan as would dispose of the sewage of the District and incidentally furnish a navigable water route from Lake Michigan to the Mississippi basin; and that not until 1903 was the attention of the public, and especially of the District authorities, drawn to the fact that a diversion like that now used would lower the Lake levels with injurious consequences to tne Great Lakes navigation and to the complainant States. The Secretary of War and the Chief of Engineers in 1907 refused a permit by which there would be more than 4,167 feet a second diverted. Advised that the District authorities proposed to ignore that limitation, the United States brought suit against the authorities of the District to enjoin any diversion in excess of that quantity, as fixed in an earlier permit. Another application for enlargement was made to Secretary of War Stimson in 1913 and was rejected. For several years, including the inexcusable delays made possible by the failure of the Federal Court in Chicago to render a decision in the suit brought by the United States, the District authorities have been maintaining the diversion of 8,500 cubic feet per second or more on the plea of preserving the health of the District. Putting this plea forward has tended materially to hamper and obstruct the remedy to which the complainants are entitled in vindication of their rights, riparian and other.

The intervening States on the same side with Illinois, in seeking a recognition of asserted rights in the navigation of the Mississippi, have answered denying the rights of the complainants to an injunction. They really seek affirmatively to preserve the diversion from Lake Michigan in the interest of such navigation and interstate commerce though they have made no express prayer therefor. In our view of the permit of March 3, 1925, and in the absence of direct authority from Congress for a waterway from Lake Michigan to the Mississippi, they show no rightful interest in the maintenance of the diversion. Their motions to dismiss the bills are overruled and so far as their answer may suggest affirmative relief, it is denied.

In increasing the division from 4,167 cubic feet a second to 8,500, the Drainage District defied the authority of the National Government resting in the Secretary of War. And in so far as the prior diversion was not for the purposes of maintaining navigation in the Chicago River it was without any legal basis, because made for an inadmissible purpose. It therefore is the duty of this Court by an appropriate decree to compel the reduction of the diversion to a point where it rests on a legal basis and thus to restore the navigable capacity of Lake Michigan to its proper level. The Sanitary District authorities, relying on the argument with reference to the health of its people, have much too long delayed the needed substitution of suitable sewage plants as a means of avoiding the diversion in the future. Therefore they can not now complain if an immediately heavy burden is placed upon the District because of their attitude and course. The situation requires the District to devise proper methods for providing sufficient money and to construct and put in operation with all reasonable expedition adequate plants for the disposition of the sewage through other means than the Lake diversion.

Though the restoration of just rights to the complainants will be gradual instead of immediate it must be continuous and as speedy as practicable, and must include everything that is essential to an effective project.

The Court expresses its obligation to the Master for his useful, fair, and comprehensive report.

To determine the practical measures needed to effect the object just stated and the period required for their completion there will be need for the examination of experts; and the appropriate provisions of the necessary decree will require careful consideration. For this reason, the case will be again referred to the Master for a further examination into the questions indicated. He will be authorized and directed to hear witnesses presented by each of the parties, and to call witnesses of his own selection, should he deem it necessary to do so, and then with all convenient speed to make report of his conclusions and of a form of decree.

It is so ordered.

CORRECTED COPY

SUPREME COURT OF THE UNITED STATES.

Nos. 7, 11 and 12, Original.—October Term, 1929.

State of Wisconsin, State of Minnesota, State of Ohio, and State of Pennsylvania, Complainants, *vs.* State of Illinois and Sanitary District of Chicago, Defendants. State of Missouri, State of Kentucky, State of Tennessee, State of Louisiana, State of Mississippi and State of Arkansas, Intervening Defendants.	No. 7, Original.
State of Michigan, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, Defendants.	No. 11, Original.
State of New York, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, Defendants.	No. 12, Original.

[April 14, 1930.]

Mr. Justice Holmes delivered the opinion of the Court.

These suits, brought to prevent the State of Illinois and the Sanitary District of Chicago from continuing to withdraw water from Lake Michigan as they now are doing, have passed through their first stage in this Court. The facts were set forth in detail and the law governing the parties was established by the decision reported in 278 U. S. 367. It was decided that the defendant State and its creature the Sanitary District were reducing the level of the Great Lakes, were inflicting great losses upon the complainants and were violating their rights, by diverting from Lake Michigan 8,500 or more cubic feet per second into the Chicago Drainage Canal for the purpose of diluting and carrying away the

sewage of Chicago. The diversion of the water for that purpose was held illegal, but the restoration of the just rights of the complainants was made gradual rather than immediate in order to avoid so far as might be the possible pestilence and ruin with which the defendants have done much to confront themselves. The case was referred a second time to the master to consider what measures would be necessary and what time required to effect the object to be attained. The master now has reported. Both sides have taken exceptions, but, as we shall endeavor to show, the issues open here are of no great scope.

The defendants have submitted their plans for the disposal of the sewage of Chicago in such a way as to diminish so far as possible the diversion of water from the Lake. In the main these plans are approved by the complainants. The master has given them a most thorough and conscientious examination. But they are material only as bearing on the amount of diminution to be required from time to time and the times to be fixed for each step, and therefore we shall not repeat the examination. It already has been decided that the defendants are doing a wrong to the complainants and that they must stop it. They must find out a way at their peril. We have only to consider what is possible if the State of Illinois devotes all its powers to dealing with an exigency to the magnitude of which it seems not yet to have fully awaked. It can base no defences upon difficulties that it has itself created. If its constitution stands in the way of prompt action it must amend it or yield to an authority that is paramount to the State.

The defendants' exceptions deal with the extent to which the diversion of water should be reduced and to the time at which the reductions should take place. They argue that a recent rise in the level of Lake Michigan should be taken into account. This cannot be done. Apart from the speculation involved as to the duration of the rise, there is a wrong to be righted, and the delays allowed are allowed only for the purpose of limiting, within fair possibility, the requirements of immediate justice pressed by the complaining States. These requirements as between the parties are the constitutional right of those States, subject to whatever modification they hereafter may be subjected to by Congress acting within its authority. It will be time enough to consider the scope of that authority when it is exercised. In present conditions there

is no invasion of it by the former decision of this Court, as urged by the defendants. The right of the complainants to a decree is not affected by the possibility that Congress may take some action in the matter. See *Southern Utilities Co.* v. *Palatka,* 268 U. S. 232, 233. *Kansas* v. *Colorado,* 206 U. S. 46, 117.

The master finds that, on and after July 1, 1930, the diversion of water from Lake Michigan should not be allowed to exceed an annual average of 6,500 cubic feet per second in addition to what is drawn for domestic uses. He finds that when the contemplated controlling works are constructed that are necessary for the purpose of preventing reversals of the Chicago River at times of storm and the introduction of storm flow into Lake Michigan, works that will require the approval of the Secretary of War and that the master finds should be completed and put in operation within two years after the approval is given, and probably by December 31, 1935, the diversion should be limited to an annual average of 5,000 c. f. s. "in addition to domestic pumpage." On this point we deal only with the amount and the time. When the whole system for sewage treatment is complete and the controlling works installed he finds that the diversion should be cut down to an annual average of 1,500 c. f. s. in addition to domestic pumpage. This, he finds, should be accomplished on or before December 31, 1938; and the full operation of one of the contemplated works, the West Side Sewage Treatment Plant, which would permit a partial reduction of the diversion is to be not later than December 31, 1935. These recommendations are subject to the appointment of a commission to supervise the work, or, better in our opinion, to the filing with the clerk of this Court, at stated periods, by the Sanitary District, of reports as to the progress of the work, at the coming in of which either party may make application to the Court for such action as may seem to be suitable. All action of the parties and the Court in this case will be subject, of course, to any order that Congress may make in pursuance of its constitutional powers and any modification that necessity may show should be made by this Court. These recommendations we approve within the limits stated above, and they will be embodied in the decree. The defendants argue for delay at every point but we have indicated sufficiently why their arguments cannot prevail. The master was as liberal in the allowance of time as the evidence permitted him to be.

The exceptions of the complainants go mainly to a point not yet mentioned. The sewage of Chicago at present is discharged into a canal that extends to Lockport on the Des Plaines River, (which flows into the Illinois, which in its turn flows into the Mississippi,) from Wilmette on the north and a point on the Lake near the boundary line of Indiana on the south, with another intake midway between these two at the mouth of the Chicago River, which has been reversed from its former flow into Lake Michigan to a flow from the Lake. The change is narrated at length in the former decision of this case. 278 U. S. 367, 401, *et seq.* See also *Missouri* v. *Illinois,* 180 U. S. 208, 211, *et seq.* s. c. 200 U. S. 496. It is partially to oxidize and carry off this sewage that the main diversion of water is made. The complainants demand that this diversion cease, and the canal be closed at Lockport, with an incidental return of the Chicago River to its original course. They also argue that what is called the domestic pumpage after being purified in the sewage works be returned to the Lake. These demands seem to us excessive upon the facts in this case. The master reports that the best way of preventing the pollution of navigable waters is to permit an outflow from the Drainage Canal at Lockport, and that the interests of navigation in the Chicago River as a part of the port of Chicago will require the diversion of an annual average of from 1,000 c. f. s. to 1,500 c. f. s. in addition to domestic pumpage after the sewage treatment program has been carried out. The canal was opened at the beginning of the century, thirty years ago. In 1900 it already was a subject of litigation in this Court. The amount of water ultimately to be withdrawn unless Congress may prescribe a different measure is relatively small. We think that upon the principles stated in *Missouri* v. *Illinois,* 200 U. S. 496, 520, *et seq.,* the claims of the complainants should not be pressed to a logical extreme without regard to relative suffering and the time during which the complainants have let the defendants go on without complaint.

Perhaps the complainants would not be very insistent with regard to the 1,000 or 1,500 c. f. s. which earlier in this case they seemed to admit to be reasonable, if their demand were allowed that the domestic pumpage be purified and returned to the Lake—a demand not contemplated by their bill. But purification is not absolute. How nearly perfect it will be with the colossal works that the defendants have started is somewhat a matter of speculation. The master estimates that with efficient operation the pro-

posed treatment should reach an average of 85 per cent purification and probably will be 90 per cent or more. Even so we are somewhat surprised that the complainants should desire the effluent returned. The withdrawal of water for domestic purposes is not assailed by the complainants and we are of opinion that the course recommended by the master is more reasonable than the opposite demand. If the amount withdrawn should be excessive, it will be open to complaint. Whether the right for domestic use extends to great industrial plants within the District has not been argued but may be open to consideration at some future time.

We see no reason why costs should not be paid by the defendants, who have made this suit necessary by persisting in unjustifiable acts. *North Dakota* v. *Minnesota*, 263 U. S. 583.

A decree will be entered to the effect that, subject to such modifications as may be ordered by the Court hereafter,

1. On and after July 1, 1930, the defendants, the State of Illinois and the Sanitary District of Chicago are enjoined from diverting any of the waters of the Great Lakes-St. Lawrence system or watershed through the Chicago Drainage Canal and its auxiliary channels or otherwise in excess of an annual average of 6,500 c. f. s. in addition to domestic pumpage.

2. That on and after December 31, 1935, unless good cause be shown to the contrary the said defendants are enjoined from diverting as above in excess of an annual average of 5,000 c. f. s. in addition to domestic pumpage.

3. That on and after December 31, 1938, the said defendants are enjoined from diverting as above in excess of the annual average of 1,500 c. f. s. in addition to domestic pumpage.

4. That the provisions of this decree as to the diverting of the waters of the Great Lakes-St. Lawrence system or watershed relate to the flow diverted by the defendants exclusive of the water drawn by the City of Chicago for domestic water supply purposes and entering the Chicago River and its branches or the Calumet River or the Chicago Drainage Canal as sewage. The amount so diverted is to be determined by deducting from the total flow at Lockport the amount of water pumped by the City of Chicago into its water mains and as so computed will include the run-off of the Chicago and Calumet drainage area.

5. That the defendant the Sanitary District of Chicago shall file with the clerk of this Court semi-annually on July first and

January first of each year, beginning July first, 1930, a report to this Court adequately setting forth the progress made in the construction of the sewage treatment plants and appurtenances outlined in the program as proposed by the Sanitary District of Chicago, and also setting forth the extent and effects of the operation of the sewage treatment plants, respectively, that shall have been placed in operation, and also the average diversion of water from Lake Michigan during the period from the entry of this decree down to the date of such report.

6. That on the coming in of each of said reports, and on due notice to the other parties, any of the parties to the above entitled suits, complainants or defendants, may apply to the Court for such action or relief, either with respect to the time to be allowed for the construction, or the progress of construction, or the methods of operation, of any of said sewage treatment plants, or with respect to the diversion of water from Lake Michigan, as may be deemed to be appropriate.

7. That any of the parties hereto, complainants or defendants, may, irrespective of the filing of the above-described reports, apply at the foot of this decree for any other or further action or relief, and this Court retains jurisdiction of the above-entitled suits for the purpose of any order or direction, or modification of this decree, or any supplemental decree, which it may deem at any time to be proper in relation to the subject matter in controversy.

The CHIEF Justice took no part in the decision or consideration of these cases.

A true copy.

Test:

Clerk, Supreme Court, U. S.

2-3-4-58

4-36

SUPREME COURT OF THE UNITED STATES.

Nos. 7, 11 and 12, Original.—October Term, 1929.

State of Wisconsin, State of Minnesota, State of Ohio, and State of Pennsylvania, Complainants, *vs.* State of Illinois and Sanitary District of Chicago, Defendants. State of Missouri, State of Kentucky, State of Tennessee, State of Louisiana, State of Mississippi, and State of Arkansas, Intervening Defendants.	No. 7, Original.
State of Michigan, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, et al., Defendants.	No. 11, Original.
State of New York, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, et al., Defendants.	No. 12, Original.

[April 21, 1930.]

ORDER.

The Court having considered the suggestions of the several parties does now, in view of its established practice, fix the compensation of Charles Evans Hughes, as Master upon the original and supplemental references in these cases, at thirty thousand dollars ($30,000), and in addition thereto allows his expenses actually incurred for printing, stenography, travel, and other items amounting to $2,775.90, all of the above to be taxed as costs in the causes.

The Chief Justice took no part in the consideration of the matters involved in this order.

A true copy.

Test:

Clerk, Supreme Court, U. S.

SUPREME COURT OF THE UNITED STATES.

Nos. 7, 11 and 12, Original.—October Term, 1929.

State of Wisconsin, State of Minnesota, State of Ohio, and State of Pennsylvania, Complainants, *vs.* State of Illinois and Sanitary District of Chicago, Defendants. State of Missouri, State of Kentucky, State of Tennessee, State of Louisiana, State of Mississippi, and State of Arkansas, Intervening Defendants.	No. 7, Original.
State of Michigan, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, et al., Defendants.	No. 11, Original.
State of New York, Complainant, *vs.* State of Illinois and Sanitary District of Chicago, et al., Defendants.	No. 12, Original.

[April 21, 1930.]

DECREE.

These Causes came on to be heard upon the pleadings, evidence, and the exceptions filed by the parties to the Report of the Special Master, as well as on the exceptions filed to the Report of the Special Master on Re-reference, and were argued by counsel. The Court now being fully advised in the premises, and for the purpose of carrying into effect the conclusions set forth in the opinions of this Court announced January 14, 1929, (278 U. S. 367), and April 14, 1930,

It is now here Ordered, Adjudged, and Decreed as follows:

1. On and after July 1, 1930, the defendants, the State of Illinois and the Sanitary District of Chicago, their employees and

agents, and all persons assuming to act under the authority of either of them, be and they hereby are enjoined from diverting any of the waters of the Great Lakes-St. Lawrence system or watershed through the Chicago Drainage Canal and its auxiliary channels or otherwise in excess of an annual average of 6,500 cubic feet per second in addition to domestic pumpage.

2. That on and after December 31, 1935, unless good cause be shown to the contrary, the defendants, the State of Illinois and the Sanitary District of Chicago, their employees and agents, and all persons assuming to act under the authority of either of them, be and they hereby are enjoined from diverting any of the waters of the Great Lakes-St. Lawrence system or watershed through the Chicago Drainage Canal and its auxiliary channels or otherwise in excess of an annual average of 5,000 cubic feet per second in addition to domestic pumpage.

3. That on and after December 31, 1938, unless good cause be shown to the contrary, the defendants, the State of Illinois and the Sanitary District of Chicago, their employees and agents, and all persons assuming to act under the authority of either of them, be and they hereby are enjoined from diverting any of the waters of the Great Lakes-St. Lawrence system or watershed through the Chicago Drainage Canal and its auxiliary channels or otherwise in excess of the annual average of 1,500 cubic feet per second in addition to domestic pumpage.

4. That the provisions of this decree as to the diverting of the waters of the Great Lakes-St. Lawrence system or watershed relate to the flow diverted by the defendants exclusive of the water drawn by the City of Chicago for domestic water supply purposes and entering the Chicago River and its branches or the Calumet River or the Chicago Drainage Canal as sewage. The amount so diverted is to be determined by deducting from the total flow at Lockport the amount of water pumped by the City of Chicago into its water mains and as so computed will include the run-off of the Chicago and Calumet drainage area.

5. That the defendant the Sanitary District of Chicago shall file with the clerk of this Court semi-annually on July first and January first of each year, beginning July first, 1930, a report to this Court adequately setting forth the progress made in the construction of the sewage treatment plants and appurtenances outlined in the program as proposed by the Sanitary District of Chicago, and also setting forth the extent and effects of the operation

of the sewage treatment plants, respectively, that shall have been placed in operation, and also the average diversion of water from Lake Michigan during the period from the entry of this decree down to the date of such report.

6. That on the coming in of each of said reports, and on due notice to the other parties, any of the parties to the above entitled suits, complainants or defendants, may apply to the Court for such action or relief, either with respect to the time to be allowed for the construction, or the progress of construction, or the methods of operation, of any of said sewage treatment plants, or with respect to the diversion of water from Lake Michigan, as may be deemed to be appropriate.

7. That any of the parties hereto, complainants or defendants, may, irrespective of the filing of the above-described reports, apply at the foot of this decree for any other or further action or relief, and this Court retains jurisdiction of the above-entitled suits for the purpose of any order or direction, or modification of this decree, or any supplemental decree, which it may deem at any time to be proper in relation to the subject matter in controversy.

AND IT IS FURTHER ORDERED that the costs in these cases shall be taxable against the defendants.

A true copy.

Test:

Clerk, Supreme Court, U. S.